

ANTIBODIES WITH LOW IMMUNOGENICITY AND USES THEREOF

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of U.S. Provisional Patent Application No. 62/359,150, filed July 6, 2016, which is incorporated by reference herein in its entirety.

REFERENCE TO SEQUENCE LISTING SUBMITTED ELECTRONICALLY

[0002] This application incorporates by reference a Sequence Listing submitted with this application as a text file entitled “12827-862-228_SL.txt” created on June 26, 2017 and having a size of 60.9 kilobytes.

1. FIELD

[0003] Provided herein are antibodies and antigen-binding fragments thereof with low or no immunogenicity in humans and additional desirable characteristics, *e.g.*, desirable manufacturing, storage and formulation properties. Also provided are compositions comprising such antibodies or antigen-binding fragments, methods of using such antibodies, and methods for making such antibodies.

2. BACKGROUND

[0004] As amply demonstrated over the past twenty-plus years, antibodies hold great potential as therapeutics for treatment and management of a wide range of disorders. An antibody's therapeutic efficacy, however, can be substantially impaired or even negated if the antibody exhibits substantial immunogenicity when administered to a subject, *e.g.*, a human subject. For example, the manufacturing, storage and/or formulation potentials of therapeutic antibodies can be limited by their properties such as solubility, stability, and expression levels.

[0005] Accordingly, there exists a need for antibodies exhibiting advantageously low immunogenicity and, ideally, additional characteristics desirable for antibody manufacturing, storage, and formulation.

3. SUMMARY

[0006] In one aspect, provided herein is an antibody or an antigen-binding fragment thereof, comprising a heavy chain variable region (VH) that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-

terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1, VH FR2, VH FR3 and VH FR4 comprise the amino acid sequence of $X_{H1}X_{H2}X_{H3}QLVQSGX_{H4}EVKKX_{H5}GX_{H6}X_{H7}VKX_{H8}SCKX_{H9}S$ (SEQ ID NO: 1);

$WVX_{H10}QAX_{H11}GX_{H12}X_{H13}LEWX_{H14}G$ (SEQ ID NO: 2);

$YAX_{H15}KX_{H16}QX_{H17}RVTX_{H18}TX_{H19}X_{H20}X_{H21}SX_{H22}X_{H23}TX_{H24}YMELX_{H25}X_{H26}LRAX_{H27}DTAX_{H28}YYC$ (SEQ ID NO: 3); and

$WGX_{H29}GTX_{H30}VTVSS$ (SEQ ID NO: 4), respectively,

wherein X_{H1} is M or no amino acid, X_{H2} is Q or E, X_{H3} is V or M, X_{H4} is A or P, X_{H5} is P or T, X_{H6} is A, S, or T, X_{H7} is S or T, X_{H8} is V or I, X_{H9} is A or V, X_{H10} is R or Q, X_{H11} is P, R, or T, X_{H12} is Q or K, X_{H13} is G, R, or A, X_{H14} is M or I, X_{H15} is Q or E, X_{H16} is F or L, X_{H17} is G, D, or E, X_{H18} is M or I, X_{H19} is R, T, E or A, X_{H20} is D or N, X_{H21} is T, R, M, E, or K, X_{H22} is I, A, T, or M, X_{H23} is S or D, X_{H24} is A or V, X_{H25} is S or R, X_{H26} is S or R, X_{H27} is D or E, X_{H28} is V or M, X_{H29} is Q or R, and X_{H30} is L, M or T.

[0007] In certain embodiments of the preceding aspect, at least one of the following is satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H12} is K, X_{H13} is G, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, X_{H28} is V, and X_{H30} is L.

[0008] In certain embodiments of the preceding aspect, at least one of the following is satisfied: X_{H5} is P, X_{H12} is K, X_{H13} is G, X_{H17} is G, X_{H22} is T, X_{H25} is R, X_{H28} is V, and X_{H30} is L.

[0009] In certain embodiments of the preceding aspect, at least one of the following is satisfied: X_{H12} is K, X_{H13} is G, and X_{H30} is L. In a specific embodiment of the certain embodiments, at least one of the following is further satisfied: X_{H5} is P, X_{H17} is G, X_{H22} is T, X_{H25} is R, and X_{H28} is V. In a further specific embodiment, at least one of the following is further satisfied: X_{H3} is V, X_{H6} is A, X_{H16} is L, X_{H18} is M, X_{H19} is T, X_{H21} is T, and X_{H27} is D. In another specific embodiment of the certain embodiments, at least one of the following is further satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V.

[0010] In specific embodiments of the preceding aspect, X_{H3} is M, X_{H6} is S, X_{H16} is F, X_{H18} is I, X_{H19} is R, X_{H21} is R, and X_{H27} is E.

[0011] In another aspect, provided herein is an antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH

complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1, VH FR2, VH FR3 and VH FR4 comprise the amino acid sequence of

$X_{H1}QX_{H3}QLVQSGAEVKKX_{H5}GX_{H6}SVKVSCKAS$ (SEQ ID NO: 5),

$WVRQAPGX_{H12}X_{H13}LEWMG$ (SEQ ID NO: 6),

$YAQKX_{H16}QX_{H17}RVTX_{H18}TX_{H19}DX_{H21}SX_{H22}STAYMELX_{H25}SLRX_{H31}X_{H27}DTAX_{H28}YYC$ (SEQ ID NO: 7), and

$WGX_{H29}GTX_{H30}VTVSS$ (SEQ ID NO: 4) respectively,

wherein X_{H1} is M or no amino acid, X_{H3} is V or M, X_{H5} is P or T, X_{H6} is A, S, or T, X_{H12} is Q or K, X_{H13} is G, R, or A, X_{H16} is F or L, X_{H17} is G, D, or E, X_{H18} is M or I, X_{H19} is R, T, E or A, X_{H21} is T, R, M, E, or K, X_{H22} is I, A T, or M, X_{H25} is S or R, X_{H31} is S or A, X_{H27} is D or E, and X_{H28} is V or M, X_{H29} is Q or R, and X_{H30} is L, M or T, and

wherein at least one of the following is satisfied: X_{H12} is K, X_{H13} is G, X_{H31} is A, and X_{H30} is L.

[0012] In a specific embodiment of the preceding aspect, at least one of the following is further satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V.

[0013] In another specific embodiment of the preceding aspect, at least one of the following is further satisfied: X_{H5} is P, X_{H17} is G, X_{H22} is T, X_{H25} is R, and X_{H28} is V. In a further specific embodiment, at least one of the following is further satisfied: X_{H3} is V, X_{H6} is A, X_{H16} is L, X_{H18} is M, X_{H19} is T, X_{H21} is T, and X_{H27} is D.

[0014] In another specific embodiment of the preceding aspect, at least one of the following is further satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V.

[0015] In specific embodiments of the preceding aspect, X_{H3} is M, X_{H6} is S, X_{H16} is F, X_{H18} is I, X_{H19} is R, X_{H21} is R, and X_{H27} is E.

[0016] In another aspect, provided herein is an antibody or antigen-binding fragment thereof comprising a light chain variable region (VL) that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL

FR4, wherein VL FR1, VL FR2, VL FR3 and VL FR4 comprise the amino acid sequence of NIQMTQSPSX_{L1}X_{L2}SASVGDRVTITC (SEQ ID NO: 8);

WX_{L3}QKPGKX_{L4}PKHLIY (SEQ ID NO: 9);

GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and

FGGGTKVEIK (SEQ ID NO: 11), respectively,

wherein X_{L1} is A or S, X_{L2} is M or L, X_{L3} is F or Y, and X_{L4} is V or A.

[0017] In certain embodiments, any of the preceding antibodies or antigen-binding fragments thereof comprise such a VL.

[0018] In certain embodiments of the preceding aspect, at least one of the following is satisfied: X_{L1} is S, X_{L2} is L, X_{L3} is Y, and X_{L4} is A. In certain embodiments, any of the preceding antibodies or antigen-binding fragments thereof comprise such a VL.

[0019] In another aspect, provided herein is an antibody or an antigen-binding fragment thereof, which specifically binds to CD47 and comprises a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein at least one of the following is satisfied: (1) VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); (2) VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and (3) VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

[0020] In another aspect, provided herein is an antibody or an antigen-binding fragment thereof, which specifically binds to CD47 and comprises a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein (1) VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); (2) VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and (3) VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

[0021] In some embodiments, the antibody or antigen-binding fragment further comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL

CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein at least one of the following is satisfied: (1) VL CDR1 comprises the amino acid sequence of $X_{C1}ASQDIHRYLS$ (SEQ ID NO: 62), wherein X_{C1} is K or R; (2) VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

[0022] In other embodiments, the antibody or antigen-binding fragment further comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of $X_{C1}ASQDIHRYLS$ (SEQ ID NO: 62), wherein X_{C1} is K or R; (2) VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

[0023] In other embodiments, the antibody or antigen-binding fragment further comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein at least one of the following is satisfied: (1) VL CDR1 comprises the amino acid sequence of $X_{C1}ASQDIHRYLS$ (SEQ ID NO: 62), wherein X_{C1} is K or R; (2) VL CDR2 comprises the amino acid sequence of $RX_{C2}X_{C3}RFVD$ (SEQ ID NO: 65), wherein X_{C2} is any amino acid with a polar or charged side chain, and X_{C3} is V, I, E, or S; and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64). In a specific embodiment, X_{C2} is Y, E, or H. In a specific embodiment, X_{C1} is R.

[0024] In other embodiments, the antibody or antigen-binding fragment further comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of $X_{C1}ASQDIHRYLS$ (SEQ ID NO: 62), wherein X_{C1} is K or R; (2) VL CDR2 comprises the amino acid sequence of $RX_{C2}X_{C3}RFVD$ (SEQ ID NO: 65), wherein X_{C2} is any amino acid with a polar or charged side chain, and X_{C3} is V, I, E, or S; and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64). In a specific embodiment, X_{C2} is Y, E, or H. In a specific embodiment, X_{C1} is R.

[0025] In other embodiments, the antibody or antigen-binding fragment further comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL CDR2 comprises the amino acid sequence of $RX_{C2}X_{C3}RFVD$ (SEQ ID NO: 65), wherein X_{C2} is any amino acid with a polar or charged side chain, and X_{C3} is V, I, E, or S. In specific embodiments, X_{C2} is Y, E, or H. In certain embodiments, VL CDR1 comprises the amino acid sequence of $X_{C1}ASQDIHRYLS$ (SEQ ID NO: 62), wherein X_{C1} is K or R. In certain embodiments, VL CDR3 comprises the amino acid sequence of $LQYDEFPTYT$ (SEQ ID NO: 64).

[0026] In another aspect, provided herein is an antibody or an antigen-binding fragment thereof, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein at least one of the following is satisfied: (1) VL CDR1 comprises the amino acid sequence of $X_{C1}ASQDIHRYLS$ (SEQ ID NO: 62), wherein X_{C1} is K or R; (2) VL CDR2 comprises the amino acid sequence of $RANRLVS$ (SEQ ID NO: 63); and (3) VL CDR3 comprises the amino acid sequence of $LQYDEFPTYT$ (SEQ ID NO: 64).

[0027] In another aspect, provided herein is an antibody or an antigen-binding fragment thereof, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of $X_{C1}ASQDIHRYLS$ (SEQ ID NO: 62), wherein X_{C1} is K or R; (2) VL CDR2 comprises the amino acid sequence of $RANRLVS$ (SEQ ID NO: 63); and (3) VL CDR3 comprises the amino acid sequence of $LQYDEFPTYT$ (SEQ ID NO: 64).

[0028] In another aspect, provided herein is an antibody or an antigen-binding fragment thereof, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein at least one of the following is satisfied: (1) VL CDR1 comprises the amino acid sequence of $X_{C1}ASQDIHRYLS$ (SEQ ID NO: 62), wherein X_{C1} is K

or R; (2) VL CDR2 comprises the amino acid sequence of $RX_{C2}X_{C3}RFVD$ (SEQ ID NO: 65), wherein X_{C2} is any amino acid with a polar or charged side chain, and X_{C3} is V, I, E, or S; and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64). In a specific embodiment, X_{C2} is Y, E, or H. In a specific embodiment, X_{C1} is R.

[0029] In another aspect, provided herein is an antibody or an antigen-binding fragment thereof, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of $X_{C1}ASQDIHRYLS$ (SEQ ID NO: 62), wherein X_{C1} is K or R; (2) VL CDR2 comprises the amino acid sequence of $RX_{C2}X_{C3}RFVD$ (SEQ ID NO: 65), wherein X_{C2} is any amino acid with a polar or charged side chain, and X_{C3} is V, I, E, or S; and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64). In a specific embodiment, X_{C2} is Y, E, or H. In a specific embodiment, X_{C1} is R.

[0030] In another aspect, provided herein is an antibody or an antigen-binding fragment thereof, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL CDR2 comprises the amino acid sequence of $RX_{C2}X_{C3}RFVD$ (SEQ ID NO: 65), wherein X_{C2} is any amino acid with a polar or charged side chain, and X_{C3} is V, I, E, or S. In specific embodiments, X_{C2} is Y, E, or H. In certain embodiments, VL CDR1 comprises the amino acid sequence of $X_{C1}ASQDIHRYLS$ (SEQ ID NO: 62), wherein X_{C1} is K or R. In certain embodiments, VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

[0031] In another aspect, provided herein is an antibody or antigen-binding fragment thereof comprising a VH described above, and further comprising a VL described above.

[0032] In another aspect, provided herein is an antibody or antigen-binding fragment thereof which specifically binds to CD47 and comprises a VH described above, wherein the VH CDRs are as described above.

[0033] In another aspect, provided herein is an antibody or antigen-binding fragment thereof which specifically binds to CD47 and comprises a VL described above, wherein the VL CDRs are as described above.

[0034] In another aspect, provided herein is an antibody or antigen-binding fragment thereof which specifically binds to CD47 and comprises a VH described above and a VL described above, wherein the VH CDRs are as described above.

[0035] In another aspect, provided herein is an antibody or antigen-binding fragment thereof which specifically binds to CD47 and comprises a VH described above and a VL described above, wherein the VL CDRs are as described above.

[0036] In another aspect, provided herein is an antibody or antigen-binding fragment thereof which specifically binds to CD47 and comprises a VH described above and a VL described above, wherein the VH CDRs are as described above, and the VL CDRs are as described above.

[0037] In another aspect, provided herein is an antibody or antigen-binding fragment thereof which specifically binds to CD47 and comprises VH CDRs described above and VL CDRs described above.

[0038] In another aspect, provided herein is an antibody or antigen-binding fragment thereof which specifically binds to CD47 and comprises a VH described above, VH CDRs described above, and VL CDRs described above.

[0039] In another aspect, provided herein is an antibody or antigen-binding fragment thereof which specifically binds to CD47 and comprises a VL described above, VH CDRs described above, and VL CDRs described above.

[0040] In various aspects, the antibody or antigen-binding fragment described herein comprises a heavy chain constant region (*e.g.*, a human constant region). In certain embodiments, the heavy chain constant region is a human IgG constant region. In a specific embodiment, the heavy chain constant region is a human IgG1 constant region. In another specific embodiment, the heavy chain constant region is a human IgG4 constant region. In a further specific embodiment, the heavy chain constant region is a human IgG4 constant region comprising a S228P amino acid substitution according to the EU numbering index. In another further specific embodiment, the heavy chain constant region is a human IgG4 constant region comprising a S228P and L235E amino acid substitutions according to the EU numbering index.

[0041] In various aspects, the antibody or antigen-binding fragment described herein comprises a light chain constant region selected from the group consisting of a human kappa constant region and a human lambda constant region.

[0042] In various aspects, the antigen-binding fragment is an Fv, Fab, F(ab')₂, Fab', dsFv, scFv, or sc(Fv)₂.

[0043] In various aspects, the antibody is a human antibody, a humanized antibody, a chimeric antibody, a recombinant antibody, a multispecific antibody, or an antigen-binding fragment thereof.

[0044] In various aspects, the antibody is a monoclonal antibody or antigen-binding fragment thereof.

[0045] In various aspects, the antibody or antigen-binding fragment described herein is an antibody.

[0046] In various aspects, the antibody or antigen-binding fragment described herein is conjugated to an agent. In specific embodiments, the agent is a label or a toxin.

[0047] In another aspect, provided herein is a pharmaceutical composition comprising a therapeutically effective amount of the antibody or antigen-binding fragment described herein, and a pharmaceutically acceptable carrier.

[0048] In another aspect, provided herein is a polynucleotide comprising a nucleotide sequence encoding the antibody or antigen-binding fragment described herein.

[0049] In another aspect, provided herein is a vector comprising the polynucleotide described herein.

[0050] In another aspect, provided herein is a method of treating cancer in a subject in need thereof, the method comprising administering to the subject the antibody or antigen-binding fragment described herein or the pharmaceutical composition described herein. In another aspect, provided herein is a method of alleviating a symptom of a cancer in a subject in need thereof, the method comprising administering to the subject the antibody or antigen-binding fragment described herein or the pharmaceutical composition described herein. In some embodiments, the method further comprises administering to the subject radiotherapy or chemotherapy. In other embodiments, the method further comprises administering to the subject another anti-cancer agent. In a specific embodiment, the cancer is a hematological cancer. In another specific embodiment, the cancer is a solid cancer. In another specific embodiment, the cancer is multiple

myeloma, non-Hodgkin's lymphoma, acute myeloid leukemia (AML), breast cancer, bladder cancer, non-small cell lung cancer/carcinoma, hepatocellular carcinoma (HCC), sarcoma, or head and neck cancer. In particular embodiments, such methods of treating cancer in a subject in need thereof, comprise administering to the subject an antibody or antigen-binding fragment described herein which specifically binds CD47, or a pharmaceutical composition thereof.

[0051] In another aspect, provided herein is an isolated cell comprising the polynucleotide described herein.

[0052] In another aspect, provided herein is an isolated cell comprising the vector described herein.

[0053] In another aspect, provided herein is an isolated cell producing the antibody or antigen-binding fragment described herein.

[0054] In another aspect, provided herein is a method of making an antibody or antigen-binding fragment thereof, comprising (a) culturing an isolated cell comprising the polynucleotide described herein; and (b) isolating the antibody or antigen-binding fragment thereof.

[0055] In another aspect, provided herein is a method of making an antibody or antigen-binding fragment thereof, comprising (a) culturing an isolated cell described herein; and (b) isolating the antibody or antigen-binding fragment thereof.

[0056] Presented, below, are non-limiting exemplary embodiments of the invention described herein:

1. An antibody or an antigen-binding fragment thereof, comprising a heavy chain variable region (VH) that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1, VH FR2, VH FR3 and VH FR4 comprise the amino acid sequence of $X_{H1}X_{H2}X_{H3}QLVQSGX_{H4}EVKKX_{H5}GX_{H6}X_{H7}VKX_{H8}SCKX_{H9}S$ (SEQ ID NO: 1); $WVX_{H10}QAX_{H11}GX_{H12}X_{H13}LEWX_{H14}G$ (SEQ ID NO: 2); $YAX_{H15}KX_{H16}QX_{H17}RVTX_{H18}TX_{H19}X_{H20}X_{H21}SX_{H22}X_{H23}TX_{H24}YMELX_{H25}X_{H26}LRAX_{H27}DTAX_{H28}YYC$ (SEQ ID NO: 3); and $WGX_{H29}GTX_{H30}VTVSS$ (SEQ ID NO: 4), respectively, wherein X_{H1} is M or no amino acid, X_{H2} is Q or E, X_{H3} is V or M, X_{H4} is A or P, X_{H5} is P or T, X_{H6} is A, S, or T, X_{H7} is S or T, X_{H8} is V or I, X_{H9} is A or V, X_{H10} is R or Q, X_{H11} is P, R, or T,

X_{H12} is Q or K, X_{H13} is G, R, or A, X_{H14} is M or I, X_{H15} is Q or E, X_{H16} is F or L, X_{H17} is G, D, or E, X_{H18} is M or I, X_{H19} is R, T, E or A, X_{H20} is D or N, X_{H21} is T, R, M, E, or K, X_{H22} is I, A, T, or M, X_{H23} is S or D, X_{H24} is A or V, X_{H25} is S or R, X_{H26} is S or R, X_{H27} is D or E, X_{H28} is V or M, X_{H29} is Q or R, and X_{H30} is L, M or T.

2. The antibody or antigen-binding fragment of embodiment 1, wherein at least one of the following is satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H12} is K, X_{H13} is G, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, X_{H28} is V, and X_{H30} is L.

3. The antibody or antigen-binding fragment of embodiment 2, wherein at least two of the following are satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H12} is K, X_{H13} is G, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, X_{H28} is V, and X_{H30} is L.

4. The antibody or antigen-binding fragment of embodiment 2, wherein at least three of the following are satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H12} is K, X_{H13} is G, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, X_{H28} is V, and X_{H30} is L.

5. The antibody or antigen-binding fragment of embodiment 2, wherein at least four of the following are satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H12} is K, X_{H13} is G, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, X_{H28} is V, and X_{H30} is L.

6. The antibody or antigen-binding fragment of embodiment 2, wherein at least five of the following are satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H12} is K, X_{H13} is G, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, X_{H28} is V, and X_{H30} is L.

7. The antibody or antigen-binding fragment of embodiment 2, wherein at least six of the following are satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H12} is K, X_{H13} is G, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, X_{H28} is V, and X_{H30} is L.

8. The antibody or antigen-binding fragment of embodiment 2, wherein at least seven of the following are satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H12} is K, X_{H13} is G, X_{H16} is

L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, X_{H28} is V, and X_{H30} is L.

9. The antibody or antigen-binding fragment of embodiment 2, wherein at least eight of the following are satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H12} is K, X_{H13} is G, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, X_{H28} is V, and X_{H30} is L.

10. The antibody or antigen-binding fragment of embodiment 2, wherein at least nine of the following are satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H12} is K, X_{H13} is G, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, X_{H28} is V, and X_{H30} is L.

11. The antibody or antigen-binding fragment of embodiment 2, wherein at least ten of the following are satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H12} is K, X_{H13} is G, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, X_{H28} is V, and X_{H30} is L.

12. The antibody or antigen-binding fragment of embodiment 2, wherein at least eleven of the following are satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H12} is K, X_{H13} is G, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, X_{H28} is V, and X_{H30} is L.

13. The antibody or antigen-binding fragment of embodiment 2, wherein at least twelve of the following are satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H12} is K, X_{H13} is G, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, X_{H28} is V, and X_{H30} is L.

14. The antibody or antigen-binding fragment of embodiment 2, wherein at least thirteen of the following are satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H12} is K, X_{H13} is G, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, X_{H28} is V, and X_{H30} is L.

15. The antibody or antigen-binding fragment of embodiment 2, wherein at least fourteen of the following are satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H12} is K, X_{H13} is G, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, X_{H28} is V, and X_{H30} is L.

16. The antibody or antigen-binding fragment of embodiment 2, wherein X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H12} is K, X_{H13} is G, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, X_{H28} is V, and X_{H30} is L.

17. The antibody or antigen-binding fragment of embodiment 1, wherein at least one of the following is satisfied: X_{H5} is P, X_{H12} is K, X_{H13} is G, X_{H17} is G, X_{H22} is T, X_{H25} is R, X_{H28} is V, and X_{H30} is L.

18. The antibody or antigen-binding fragment of embodiment 17, wherein at least two of the following are satisfied: X_{H5} is P, X_{H12} is K, X_{H13} is G, X_{H17} is G, X_{H22} is T, X_{H25} is R, X_{H28} is V, and X_{H30} is L.

19. The antibody or antigen-binding fragment of embodiment 17, wherein at least three of the following are satisfied: X_{H5} is P, X_{H12} is K, X_{H13} is G, X_{H17} is G, X_{H22} is T, X_{H25} is R, X_{H28} is V, and X_{H30} is L.

20. The antibody or antigen-binding fragment of embodiment 17, wherein at least four of the following are satisfied: X_{H5} is P, X_{H12} is K, X_{H13} is G, X_{H17} is G, X_{H22} is T, X_{H25} is R, X_{H28} is V, and X_{H30} is L.

21. The antibody or antigen-binding fragment of embodiment 17, wherein at least five of the following are satisfied: X_{H5} is P, X_{H12} is K, X_{H13} is G, X_{H17} is G, X_{H22} is T, X_{H25} is R, X_{H28} is V, and X_{H30} is L.

22. The antibody or antigen-binding fragment of embodiment 17, wherein at least six of the following are satisfied: X_{H5} is P, X_{H12} is K, X_{H13} is G, X_{H17} is G, X_{H22} is T, X_{H25} is R, X_{H28} is V, and X_{H30} is L.

23. The antibody or antigen-binding fragment of embodiment 17, wherein at least seven of the following are satisfied: X_{H5} is P, X_{H12} is K, X_{H13} is G, X_{H17} is G, X_{H22} is T, X_{H25} is R, X_{H28} is V, and X_{H30} is L.

24. The antibody or antigen-binding fragment of embodiment 17, wherein X_{H5} is P, X_{H12} is K, X_{H13} is G, X_{H17} is G, X_{H22} is T, X_{H25} is R, X_{H28} is V, and X_{H30} is L.

25. The antibody or antigen-binding fragment of embodiment 1, wherein at least one of the following is satisfied: X_{H12} is K, X_{H13} is G, and X_{H30} is L.

26. The antibody or antigen-binding fragment of embodiment 25, wherein at least two of the following are satisfied: X_{H12} is K, X_{H13} is G, and X_{H30} is L.

27. The antibody or antigen-binding fragment of embodiment 25, wherein X_{H12} is K, X_{H13} is G, and X_{H30} is L.

28. The antibody or antigen-binding fragment of any of embodiments 25-27, wherein at least one of the following is satisfied: X_{H5} is P, X_{H17} is G, X_{H22} is T, X_{H25} is R, and X_{H28} is V.

29. The antibody or antigen-binding fragment of embodiment 28, wherein at least two of the following are satisfied: X_{H5} is P, X_{H17} is G, X_{H22} is T, X_{H25} is R, and X_{H28} is V.

30. The antibody or antigen-binding fragment of embodiment 28, wherein at least three of the following are satisfied: X_{H5} is P, X_{H17} is G, X_{H22} is T, X_{H25} is R, and X_{H28} is V.

31. The antibody or antigen-binding fragment of embodiment 28, wherein at least four of the following are satisfied: X_{H5} is P, X_{H17} is G, X_{H22} is T, X_{H25} is R, and X_{H28} is V.

32. The antibody or antigen-binding fragment of embodiment 28, wherein X_{H5} is P, X_{H17} is G, X_{H22} is T, X_{H25} is R, and X_{H28} is V.

33. The antibody or antigen-binding fragment of any of embodiments 1-32, wherein X_{H3} is M, X_{H6} is S, X_{H16} is F, X_{H18} is I, X_{H19} is R, X_{H21} is R, and X_{H27} is E.

34. The antibody or antigen-binding fragment of any of embodiments 25-27, wherein at least one of the following is satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V.

35. The antibody or antigen-binding fragment of embodiment 34, wherein at least two of the following are satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V.

36. The antibody or antigen-binding fragment of embodiment 34, wherein at least three of the following are satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V.

37. The antibody or antigen-binding fragment of embodiment 34, wherein at least four of the following are satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V.

38. The antibody or antigen-binding fragment of embodiment 34, wherein at least five of the following are satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V.

39. The antibody or antigen-binding fragment of embodiment 34, wherein at least six of the following are satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V.

40. The antibody or antigen-binding fragment of embodiment 34, wherein at least seven of the following are satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V.

41. The antibody or antigen-binding fragment of embodiment 34, wherein at least eight of the following are satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V.

42. The antibody or antigen-binding fragment of embodiment 34, wherein at least nine of the following are satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V.

43. The antibody or antigen-binding fragment of embodiment 34, wherein at least ten of the following are satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V.

44. The antibody or antigen-binding fragment of embodiment 34, wherein at least eleven of the following are satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V.

45. The antibody or antigen-binding fragment of embodiment 34, wherein X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V.

46. The antibody or antigen-binding fragment of any of embodiments 28-32, wherein at least one of the following is satisfied: X_{H3} is V, X_{H6} is A, X_{H16} is L, X_{H18} is M, X_{H19} is T, X_{H21} is T, and X_{H27} is D.

47. The antibody or antigen-binding fragment of embodiment 46, wherein at least two of the following are satisfied: X_{H3} is V, X_{H6} is A, X_{H16} is L, X_{H18} is M, X_{H19} is T, X_{H21} is T, and X_{H27} is D.

48. The antibody or antigen-binding fragment of embodiment 46, wherein at least three of the following are satisfied: X_{H3} is V, X_{H6} is A, X_{H16} is L, X_{H18} is M, X_{H19} is T, X_{H21} is T, and X_{H27} is D.

49. The antibody or antigen-binding fragment of embodiment 46, wherein at least four of the following are satisfied: X_{H3} is V, X_{H6} is A, X_{H16} is L, X_{H18} is M, X_{H19} is T, X_{H21} is T, and X_{H27} is D.

50. The antibody or antigen-binding fragment of embodiment 46, wherein at least five of the following are satisfied: X_{H3} is V, X_{H6} is A, X_{H16} is L, X_{H18} is M, X_{H19} is T, X_{H21} is T, and X_{H27} is D.

51. The antibody or antigen-binding fragment of embodiment 46, wherein at least six of the following are satisfied: X_{H3} is V, X_{H6} is A, X_{H16} is L, X_{H18} is M, X_{H19} is T, X_{H21} is T, and X_{H27} is D.

52. The antibody or antigen-binding fragment of embodiment 46, wherein X_{H3} is V, X_{H6} is A, X_{H16} is L, X_{H18} is M, X_{H19} is T, X_{H21} is T, and X_{H27} is D.

53. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1, VH FR2, VH FR3 and VH FR4 comprise the amino acid sequence of $X_{H1}QX_{H3}QLVQSGAEVKKX_{H5}GX_{H6}SVKVSCKAS$ (SEQ ID NO: 5),

WVRQAPGX X_{H12} X_{H13} LEWMG (SEQ ID NO: 6),

YAQKX X_{H16} X_{H17} RVTX X_{H18} TX X_{H19} DX X_{H21} SX X_{H22} STAYMELX X_{H25} SLRX X_{H31} X_{H27} DTAX X_{H28} YYC (SEQ ID NO: 7), and

WGX X_{H29} GTX X_{H30} VTVSS (SEQ ID NO: 4) respectively,

wherein X_{H1} is M or no amino acid, X_{H3} is V or M, X_{H5} is P or T, X_{H6} is A, S, or T, X_{H12} is Q or K, X_{H13} is G, R, or A, X_{H16} is F or L, X_{H17} is G, D, or E, X_{H18} is M or I, X_{H19} is R, T, E or A, X_{H21} is T, R, M, E, or K, X_{H22} is I, A T, or M, X_{H25} is S or R, X_{H31} is S or A, X_{H27} is D or E, and X_{H28} is V or M, X_{H29} is Q or R, and X_{H30} is L, M or T, and

wherein at least one of the following is satisfied: X_{H12} is K, X_{H13} is G, X_{H31} is A, and X_{H30} is L.

54. The antibody or antigen-binding fragment of embodiment 53, wherein at least two of the following are satisfied: X_{H12} is K, X_{H13} is G, X_{H31} is A, and X_{H30} is L.

55. The antibody or antigen-binding fragment of embodiment 53, wherein at least three of the following are satisfied: X_{H12} is K, X_{H13} is G, X_{H31} is A, and X_{H30} is L.

56. The antibody or antigen-binding fragment of embodiment 53, wherein X_{H12} is K, X_{H13} is G, X_{H31} is A, and X_{H30} is L.

57. The antibody or antigen-binding fragment of any of embodiments 53-56, wherein at least one of the following is satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V.

58. The antibody or antigen-binding fragment of embodiment 57, wherein at least two of the following are satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V.

59. The antibody or antigen-binding fragment of embodiment 57, wherein at least three of the following are satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V.

60. The antibody or antigen-binding fragment of embodiment 57, wherein at least four of the following are satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V.

61. The antibody or antigen-binding fragment of embodiment 57, wherein at least five of the following are satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V.

62. The antibody or antigen-binding fragment of embodiment 57, wherein at least six of the following are satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V.

63. The antibody or antigen-binding fragment of embodiment 57, wherein at least seven of the following are satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V.

64. The antibody or antigen-binding fragment of embodiment 57, wherein at least eight of the following are satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V.

65. The antibody or antigen-binding fragment of embodiment 57, wherein at least nine of the following are satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V.

66. The antibody or antigen-binding fragment of embodiment 57, wherein at least ten of the following are satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V.

67. The antibody or antigen-binding fragment of embodiment 57, wherein at least eleven of the following are satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V.

68. The antibody or antigen-binding fragment of embodiment 57, wherein X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V.

69. The antibody or antigen-binding fragment of any of embodiments 53-56, wherein at least one of the following is satisfied: X_{H5} is P, X_{H17} is G, X_{H22} is T, X_{H25} is R, and X_{H28} is V.

70. The antibody or antigen-binding fragment of embodiment 69, wherein at least two of the following are satisfied: X_{H5} is P, X_{H17} is G, X_{H22} is T, X_{H25} is R, and X_{H28} is V.

71. The antibody or antigen-binding fragment of embodiment 69, wherein at least three of the following are satisfied: X_{H5} is P, X_{H17} is G, X_{H22} is T, X_{H25} is R, and X_{H28} is V.

72. The antibody or antigen-binding fragment of embodiment 69, wherein at least four of the following are satisfied: X_{H5} is P, X_{H17} is G, X_{H22} is T, X_{H25} is R, and X_{H28} is V.

73. The antibody or antigen-binding fragment of embodiment 69, wherein X_{H5} is P, X_{H17} is G, X_{H22} is T, X_{H25} is R, and X_{H28} is V.

74. The antibody or antigen-binding fragment of any of embodiments 53-73, wherein X_{H3} is M, X_{H6} is S, X_{H16} is F, X_{H18} is I, X_{H19} is R, X_{H21} is R, and X_{H27} is E.

75. The antibody or antigen-binding fragment of any of embodiments 53-56, wherein at least one of the following is satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V.

76. The antibody or antigen-binding fragment of embodiment 75, wherein at least two of the following are satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V.

77. The antibody or antigen-binding fragment of embodiment 75, wherein at least three of the following are satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V.

78. The antibody or antigen-binding fragment of embodiment 75, wherein at least four of the following are satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V.

79. The antibody or antigen-binding fragment of embodiment 75, wherein at least five of the following are satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V.

80. The antibody or antigen-binding fragment of embodiment 75, wherein at least six of the following are satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V.

81. The antibody or antigen-binding fragment of embodiment 75, wherein at least seven of the following are satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V.

82. The antibody or antigen-binding fragment of embodiment 75, wherein at least eight of the following are satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V.

83. The antibody or antigen-binding fragment of embodiment 75, wherein at least nine of the following are satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V.

84. The antibody or antigen-binding fragment of embodiment 75, wherein at least ten of the following are satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V.

85. The antibody or antigen-binding fragment of embodiment 75, wherein at least eleven of the following are satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V.

86. The antibody or antigen-binding fragment of embodiment 75, wherein X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V.

87. The antibody or antigen-binding fragment of any of embodiments 69-73, wherein at least one of the following is satisfied: X_{H3} is V, X_{H6} is A, X_{H16} is L, X_{H18} is M, X_{H19} is T, X_{H21} is T, and X_{H27} is D.

88. The antibody or antigen-binding fragment of embodiment 87, wherein at least two of the following are satisfied: X_{H3} is V, X_{H6} is A, X_{H16} is L, X_{H18} is M, X_{H19} is T, X_{H21} is T, and X_{H27} is D.

89. The antibody or antigen-binding fragment of embodiment 87, wherein at least three of the following are satisfied: X_{H3} is V, X_{H6} is A, X_{H16} is L, X_{H18} is M, X_{H19} is T, X_{H21} is T, and X_{H27} is D.

90. The antibody or antigen-binding fragment of embodiment 87, wherein at least four of the following are satisfied: X_{H3} is V, X_{H6} is A, X_{H16} is L, X_{H18} is M, X_{H19} is T, X_{H21} is T, and X_{H27} is D.

91. The antibody or antigen-binding fragment of embodiment 87, wherein at least five of the following are satisfied: X_{H3} is V, X_{H6} is A, X_{H16} is L, X_{H18} is M, X_{H19} is T, X_{H21} is T, and X_{H27} is D.

92. The antibody or antigen-binding fragment of embodiment 87, wherein at least six of the following are satisfied: X_{H3} is V, X_{H6} is A, X_{H16} is L, X_{H18} is M, X_{H19} is T, X_{H21} is T, and X_{H27} is D.

93. The antibody or antigen-binding fragment of embodiment 87, wherein X_{H3} is V, X_{H6} is A, X_{H16} is L, X_{H18} is M, X_{H19} is T, X_{H21} is T, and X_{H27} is D.

94. The antibody or antigen-binding fragment of any of embodiments 1-93, further comprising a light chain variable region (VL) that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1, VL FR2, VL FR3 and VL FR4 comprise the amino acid sequence of NIQMTQSPSX_{L1}X_{L2}SASVGDRVTITC (SEQ ID NO: 8); WX_{L3}QQKPGKX_{L4}PKHLIY (SEQ ID NO: 9); GVPSRFGSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and FGGGTKVEIK (SEQ ID NO: 11), respectively, wherein X_{L1} is A or S, X_{L2} is M or L, X_{L3} is F or Y, and X_{L4} is V or A.

95. The antibody or antigen-binding fragment of embodiment 94, wherein at least one of the following is satisfied: X_{L1} is S, X_{L2} is L, X_{L3} is Y, and X_{L4} is A.

96. The antibody or antigen-binding fragment of embodiment 95, wherein at least two of the following are satisfied: X_{L1} is S, X_{L2} is L, X_{L3} is Y, and X_{L4} is A.

97. The antibody or antigen-binding fragment of embodiment 95, wherein at least three of the following are satisfied: X_{L1} is S, X_{L2} is L, X_{L3} is Y, and X_{L4} is A.

98. The antibody or antigen-binding fragment of embodiment 95, wherein X_{L1} is S, X_{L2} is L, X_{L3} is Y, and X_{L4} is A.

99. An antibody or an antigen-binding fragment thereof, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1, VL FR2, VL FR3 and VL FR4 comprise the amino acid sequence of

NIQMTQSPS X_{L1} X_{L2} SASVGDRVTITC (SEQ ID NO: 8);

WX X_{L3} QQKPGK X_{L4} PKHLIY (SEQ ID NO: 9);

GVPSRFGSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and

FGGGTKVEIK (SEQ ID NO: 11), respectively,

wherein X_{L1} is A or S, X_{L2} is M or L, X_{L3} is F or Y, and X_{L4} is V or A, and at least one of the following is satisfied: X_{L1} is S, X_{L2} is L, X_{L3} is Y, and X_{L4} is A.

100. The antibody or antigen-binding fragment of embodiment 99, wherein at least two of the following are satisfied: X_{L1} is S, X_{L2} is L, X_{L3} is Y, and X_{L4} is A.

101. The antibody or antigen-binding fragment of embodiment 99, wherein at least three of the following are satisfied: X_{L1} is S, X_{L2} is L, X_{L3} is Y, and X_{L4} is A.

102. The antibody or antigen-binding fragment of embodiment 99, wherein X_{L1} is S, X_{L2} is L, X_{L3} is Y, and X_{L4} is A.

103. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRSEDTAMYYC (SEQ ID NO: 14); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

104. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 14); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

105. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 18); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

106. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 14); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

107. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid

sequence of X_{HI} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{HI} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 14); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

108. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{HI} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{HI} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 18); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

109. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{HI} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{HI} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 14); and VH FR4 comprises the amino acid sequence of WGQGTTLVTVSS (SEQ ID NO: 19).

110. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{HI} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{HI} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGGGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of

YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 18); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

111. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 14); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

112. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 18); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

113. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 18); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

114. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining

regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 14); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

115. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 18); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

116. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 18); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

117. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG

(SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 18); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

118. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 14); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

119. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 22); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

120. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRSEDAMYYC (SEQ ID NO: 23); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

121. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRSEDAMYYC (SEQ ID NO: 24); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

122. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 25); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

123. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 22); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

124. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid

sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRSEDAMYYC (SEQ ID NO: 23); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

125. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRSEDAMYYC (SEQ ID NO: 24); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

126. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 25); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

127. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of

YAQKFQGRVTITRDRSTSTAYMELSSLRSEDAMYYC (SEQ ID NO: 26); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

128. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRSEDAMYYC (SEQ ID NO: 27); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

129. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 28); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

130. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRSEDAMYYC (SEQ ID NO: 29); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

131. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining

regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRSEDNAVYYC (SEQ ID NO: 30); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

132. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRSEDNAVYYC (SEQ ID NO: 31); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

133. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRSEDNAVYYC (SEQ ID NO: 26); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

134. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG

(SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRSEDAMYYC (SEQ ID NO: 27); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

135. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 28); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

136. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRSEDAMYYC (SEQ ID NO: 29); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

137. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRSEDAMYYC (SEQ ID NO: 30); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

138. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRSEDNAVYYC (SEQ ID NO: 31); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

139. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRSEDNAVYYC (SEQ ID NO: 32); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

140. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRSEDNAVYYC (SEQ ID NO: 33); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

141. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid

sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 34); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

142. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 35); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

143. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRSEDVAMYVC (SEQ ID NO: 32); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

144. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of

YAQKFQGRVTITRDRSTSTAYMELSSLRSEDNAVYYC (SEQ ID NO: 33); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

145. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRSEDNAVYYC (SEQ ID NO: 34); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

146. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRSEDNAVYYC (SEQ ID NO: 35); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

147. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRSEDNAVYYC (SEQ ID NO: 36); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

148. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining

regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRSEDNAVYYC (SEQ ID NO: 36); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

149. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRSEDNAVYYC (SEQ ID NO: 14); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

150. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRSEDNAVYYC (SEQ ID NO: 22); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

151. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG

(SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRSEDAMYYC (SEQ ID NO: 23); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

152. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRSEDAMYYC (SEQ ID NO: 24); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

153. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 25); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

154. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 22); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

155. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRSEDAMYYC (SEQ ID NO: 23); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

156. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRSEDAMYYC (SEQ ID NO: 24); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

157. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 25); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

158. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid

sequence of X_{HI} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{HI} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRSEDAMYYC (SEQ ID NO: 26); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

159. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{HI} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{HI} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRSEDAMYYC (SEQ ID NO: 27); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

160. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{HI} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{HI} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 28); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

161. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{HI} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{HI} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of

YAQKFQDRVTITRDRSTSTAYMELRSLRSEDAMYYC (SEQ ID NO: 29); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

162. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRSEDNAVYYC (SEQ ID NO: 30); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

163. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRSEDNAVYYC (SEQ ID NO: 31); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

164. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRSEDAMYYC (SEQ ID NO: 26); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

165. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining

regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRSEDAMYYC (SEQ ID NO: 27); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

166. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 28); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

167. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRSEDAMYYC (SEQ ID NO: 29); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

168. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG

(SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRSED TAVYYC (SEQ ID NO: 30); and VH FR4 comprises the amino acid sequence of WGQGTTVT VSS (SEQ ID NO: 15).

169. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRSED TAVYYC (SEQ ID NO: 31); and VH FR4 comprises the amino acid sequence of WGQGTTVT VSS (SEQ ID NO: 15).

170. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRSED TAMY YC (SEQ ID NO: 32); and VH FR4 comprises the amino acid sequence of WGQGTTVT VSS (SEQ ID NO: 15).

171. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRSED TAVYYC (SEQ ID NO: 33); and VH FR4 comprises the amino acid sequence of WGQGTTVT VSS (SEQ ID NO: 15).

172. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{HI} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{HI} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 34); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

173. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{HI} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{HI} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 35); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

174. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{HI} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{HI} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 32); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

175. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid

sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRSEDVAVYYC (SEQ ID NO: 33); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

176. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 34); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

177. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 35); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

178. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of

YAQKFQGRVTITRDRSTSTAYMELRSLRSEDNAVYYC (SEQ ID NO: 36); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

179. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRSEDNAVYYC (SEQ ID NO: 36); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

180. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 18); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

181. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 37); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

182. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining

regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAMYCY (SEQ ID NO: 38); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

183. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAMYCY (SEQ ID NO: 39); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

184. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 40); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

185. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG

(SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 37); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

186. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV $SCKAS$ (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 38); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

187. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV $SCKAS$ (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 39); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

188. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV $SCKAS$ (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 40); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

189. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAMYCY (SEQ ID NO: 41); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

190. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAMYCY (SEQ ID NO: 42); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

191. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 43); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

192. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid

sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 44); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

193. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 45); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

194. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 46); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

195. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of

YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAMYCY (SEQ ID NO: 41); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

196. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAMYCY (SEQ ID NO: 42); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

197. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 43); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

198. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAMYCY (SEQ ID NO: 44); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

199. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining

regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 45); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

200. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 46); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

201. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 47); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

202. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG

(SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 48); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

203. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 49); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

204. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 50); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

205. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 47); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

206. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 48); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

207. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 49); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

208. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 50); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

209. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid

sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 139); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

210. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 139); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

211. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 14); and VH FR4 comprises the amino acid sequence of WGQGTTLVTVSS (SEQ ID NO: 19).

212. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of

YAQKFQGRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 22); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

213. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRSEDAMYYC (SEQ ID NO: 23); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

214. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRSEDAMYYC (SEQ ID NO: 24); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

215. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 25); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

216. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining

regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 22); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

217. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRSEDAMYYC (SEQ ID NO: 23); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

218. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRSEDAMYYC (SEQ ID NO: 24); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

219. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG

(SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRSEDTAVYYC (SEQ ID NO: 25); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

220. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRSEDTAMYCYC (SEQ ID NO: 26); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

221. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRSEDTAMYCYC (SEQ ID NO: 27); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

222. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRSEDTAVYYC (SEQ ID NO: 28); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

223. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRSEDAMYYC (SEQ ID NO: 29); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

224. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRSEDAMYYC (SEQ ID NO: 30); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

225. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRSEDAMYYC (SEQ ID NO: 31); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

226. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid

sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRSEDAMYYC (SEQ ID NO: 26); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

227. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRSEDAMYYC (SEQ ID NO: 27); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

228. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 28); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

229. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of

YAQKFQDRVTITRDRSTSTAYMELRSLRSEDAMYYC (SEQ ID NO: 29); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

230. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRSEDNAVYYC (SEQ ID NO: 30); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

231. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRSEDNAVYYC (SEQ ID NO: 31); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

232. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRSEDAMYYC (SEQ ID NO: 32); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

233. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining

regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRSEDVAVYYC (SEQ ID NO: 33); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

234. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 34); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

235. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 35); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

236. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG

(SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRSEDAMYYC (SEQ ID NO: 32); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

237. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV $SCKAS$ (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRSED $TAVYYC$ (SEQ ID NO: 33); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

238. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV $SCKAS$ (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRSED $TAVYYC$ (SEQ ID NO: 34); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

239. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV $SCKAS$ (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRSED $TAVYYC$ (SEQ ID NO: 35); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

240. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 36); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

241. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 36); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

242. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRSEDVAMYCY (SEQ ID NO: 14); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

243. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid

sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 22); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

244. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRSEDAMYYC (SEQ ID NO: 23); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

245. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRSEDAMYYC (SEQ ID NO: 24); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

246. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of

YAQKFQDRVTITRDRSMSTAYMELSSLRSEDNAVYYC (SEQ ID NO: 25); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

247. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRSEDNAVYYC (SEQ ID NO: 22); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

248. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRSEDNAVYYC (SEQ ID NO: 23); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

249. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRSEDNAVYYC (SEQ ID NO: 24); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

250. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining

regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRSEDNAVYYC (SEQ ID NO: 25); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

251. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRSEDNAVYYC (SEQ ID NO: 26); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

252. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRSEDNAVYYC (SEQ ID NO: 27); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

253. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG

(SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRSEDVAVYYC (SEQ ID NO: 28); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

254. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 29); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

255. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRSEDVAVYYC (SEQ ID NO: 30); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

256. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 31); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

257. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRSEDAMYYC (SEQ ID NO: 26); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

258. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRSEDAMYYC (SEQ ID NO: 27); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

259. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 28); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

260. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid

sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRSEDAMYYC (SEQ ID NO: 29); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

261. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRSEDNAVYYC (SEQ ID NO: 30); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

262. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRSEDNAVYYC (SEQ ID NO: 31); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

263. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of

YAQKFQGRVTITRDRSTSTAYMELRSLRSEDAMYYC (SEQ ID NO: 32); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

264. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRSEDNAVYYC (SEQ ID NO: 33); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

265. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRSEDNAVYYC (SEQ ID NO: 34); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

266. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRSEDNAVYYC (SEQ ID NO: 35); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

267. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining

regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRSEDAMYYC (SEQ ID NO: 32); and VH FR4 comprises the amino acid sequence of WGQGTTTVTVSS (SEQ ID NO: 15).

268. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRSEDATVYYC (SEQ ID NO: 33); and VH FR4 comprises the amino acid sequence of WGQGTTTVTVSS (SEQ ID NO: 15).

269. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRSEDATVYYC (SEQ ID NO: 34); and VH FR4 comprises the amino acid sequence of WGQGTTTVTVSS (SEQ ID NO: 15).

270. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG

(SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 35); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

271. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 36); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

272. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 36); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

273. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 18); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

274. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAMYCY (SEQ ID NO: 37); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

275. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAMYCY (SEQ ID NO: 38); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

276. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAMYCY (SEQ ID NO: 39); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

277. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid

sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 40); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

278. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 37); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

279. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 38); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

280. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of

YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAMYCY (SEQ ID NO: 39); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

281. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 40); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

282. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAMYCY (SEQ ID NO: 41); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

283. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAMYCY (SEQ ID NO: 42); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

284. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining

regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 43); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

285. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 44); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

286. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 45); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

287. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG

(SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 46); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

288. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 41); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

289. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 42); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

290. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 43); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

291. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 44); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

292. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 45); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

293. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 46); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

294. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid

sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 47); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

295. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 48); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

296. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 49); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

297. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of

YAQKFQDRVITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 50); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

298. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 47); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

299. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 48); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

300. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 49); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

301. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining

regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 50); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

302. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 139); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

303. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 139); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

304. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG

(SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 14); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

305. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 22); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

306. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRSEDAMYYC (SEQ ID NO: 23); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

307. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRSEDAMYYC (SEQ ID NO: 24); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

308. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRSEDNAVYYC (SEQ ID NO: 25); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

309. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRSEDNAVYYC (SEQ ID NO: 22); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

310. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRSEDNAVYYC (SEQ ID NO: 23); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

311. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid

sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRSEDAMYYC (SEQ ID NO: 24); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

312. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 25); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

313. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRSEDAMYYC (SEQ ID NO: 26); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

314. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of

YAQKFQGRVTITRDRSMSTAYMELRSLRSEDAMYYC (SEQ ID NO: 27); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

315. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 28); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

316. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRSEDAMYYC (SEQ ID NO: 29); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

317. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRSEDAMYYC (SEQ ID NO: 30); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

318. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining

regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 31); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

319. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRSEDVAVYYC (SEQ ID NO: 26); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

320. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 27); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

321. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG

(SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRSEDVAVYYC (SEQ ID NO: 28); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

322. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV $SCKAS$ (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 29); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

323. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV $SCKAS$ (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRSEDVAVYYC (SEQ ID NO: 30); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

324. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV $SCKAS$ (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 31); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

325. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRSEDAMYYC (SEQ ID NO: 32); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

326. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRSEDAMYYC (SEQ ID NO: 33); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

327. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRSEDAMYYC (SEQ ID NO: 34); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

328. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid

sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 35); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

329. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 32); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

330. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRSEDVAVYYC (SEQ ID NO: 33); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

331. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of

YAQKFQGRVTITRDRSMSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 34); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

332. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 35); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

333. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 36); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

334. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 36); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

335. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining

regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 18); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

336. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 37); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

337. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 38); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

338. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG

(SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 39); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

339. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 40); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

340. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 37); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

341. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 38); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

342. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAMYCY (SEQ ID NO: 39); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

343. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 40); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

344. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAMYCY (SEQ ID NO: 41); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

345. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid

sequence of X_{HI} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{HI} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAMYCY (SEQ ID NO: 42); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

346. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{HI} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{HI} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 43); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

347. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{HI} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{HI} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAMYCY (SEQ ID NO: 44); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

348. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{HI} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{HI} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of

YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 45); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

349. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 46); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

350. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 41); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

351. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 42); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

352. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining

regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 43); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

353. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 44); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

354. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 45); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

355. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG

(SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 46); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

356. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 47); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

357. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 48); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

358. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 49); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

359. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 50); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

360. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 47); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

361. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 48); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

362. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid

sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 49); and VH FR4 comprises the amino acid sequence of WGQGTTTVTVSS (SEQ ID NO: 15).

363. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 50); and VH FR4 comprises the amino acid sequence of WGQGTTTVTVSS (SEQ ID NO: 15).

364. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 139); and VH FR4 comprises the amino acid sequence of WGQGTTTVTVSS (SEQ ID NO: 15).

365. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of

YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 139); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

366. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 14); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

367. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 22); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

368. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRSEDAMYYC (SEQ ID NO: 23); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

369. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining

regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRSEDAMYYC (SEQ ID NO: 24); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

370. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 25); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

371. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 22); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

372. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG

(SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRSEDAMYCY (SEQ ID NO: 23); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

373. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRSEDAMYCY (SEQ ID NO: 24); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

374. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRSEDAMYCY (SEQ ID NO: 25); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

375. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRSEDAMYCY (SEQ ID NO: 26); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

376. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRSEDAMYYC (SEQ ID NO: 27); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

377. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 28); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

378. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTAYMELRSLRSEDAMYYC (SEQ ID NO: 29); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

379. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid

sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRSEDVAVYYC (SEQ ID NO: 30); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

380. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 31); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

381. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRSEDVAVYYC (SEQ ID NO: 26); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

382. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of

YAQKFQGRVTITRDRSMSTAYMELRSLRSEDAMYYC (SEQ ID NO: 27); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

383. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 28); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

384. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRSEDAMYYC (SEQ ID NO: 29); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

385. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRSEDAMYYC (SEQ ID NO: 30); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

386. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining

regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 31); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

387. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 32); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

388. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRSEDVAVYYC (SEQ ID NO: 33); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

389. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG

(SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 34); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

390. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 35); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

391. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 32); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

392. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRSEDVAVYYC (SEQ ID NO: 33); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

393. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 34); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

394. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 35); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

395. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 36); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

396. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid

sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 36); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

397. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 18); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

398. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 37); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

399. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of

YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 38); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

400. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 39); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

401. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 40); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

402. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 37); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

403. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining

regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAMYCY (SEQ ID NO: 38); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

404. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAMYCY (SEQ ID NO: 39); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

405. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 40); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

406. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG

(SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 41); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

407. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 42); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

408. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 43); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

409. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 44); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

410. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 45); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

411. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 46); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

412. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 41); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

413. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid

sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAMYCY (SEQ ID NO: 42); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

414. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 43); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

415. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAMYCY (SEQ ID NO: 44); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

416. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of

YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 45); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

417. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 46); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

418. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 47); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

419. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 48); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

420. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining

regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 49); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

421. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 50); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

422. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 47); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

423. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG

(SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 48); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

424. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 49); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

425. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 50); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

426. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 139); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

427. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 139); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

428. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 18); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

429. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 37); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

430. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid

sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 38); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

431. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 39); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

432. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 40); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

433. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of

YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 37); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

434. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 38); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

435. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 39); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

436. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 40); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

437. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining

regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAMYCY (SEQ ID NO: 41); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

438. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAMYCY (SEQ ID NO: 42); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

439. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 43); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

440. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG

(SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 44); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

441. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 45); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

442. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 46); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

443. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 41); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

444. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{HI} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{HI} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAMYCY (SEQ ID NO: 42); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

445. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{HI} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{HI} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 43); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

446. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{HI} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{HI} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAMYCY (SEQ ID NO: 44); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

447. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid

sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 45); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

448. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 46); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

449. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 47); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

450. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of

YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 48); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

451. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 49); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

452. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 50); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

453. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 47); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

454. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining

regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 48); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

455. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 49); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

456. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 50); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

457. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG

(SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 139); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

458. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 139); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15).

459. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 14); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

460. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 22); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

461. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRSEDAMYYC (SEQ ID NO: 23); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

462. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRSEDAMYYC (SEQ ID NO: 24); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

463. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 25); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

464. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid

sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 22); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

465. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRSEDAMYYC (SEQ ID NO: 23); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

466. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRSEDAMYYC (SEQ ID NO: 24); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

467. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of

YAQKFQDRVITITRDRSMSTAYMELSSLRSEDNAVYYC (SEQ ID NO: 25); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

468. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRSEDNAVYYC (SEQ ID NO: 26); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

469. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRSEDNAVYYC (SEQ ID NO: 27); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

470. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRSEDNAVYYC (SEQ ID NO: 28); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

471. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining

regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRSEDAMYYC (SEQ ID NO: 29); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

472. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRSEDATVYYC (SEQ ID NO: 30); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

473. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRSEDATVYYC (SEQ ID NO: 31); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

474. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGGLEWMG

(SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRSEDAMYYC (SEQ ID NO: 26); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

475. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV $SCKAS$ (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRSEDAMYYC (SEQ ID NO: 27); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

476. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV $SCKAS$ (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRSED $AVYYC$ (SEQ ID NO: 28); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

477. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV $SCKAS$ (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRSEDAMYYC (SEQ ID NO: 29); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

478. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRSEDNAVYYC (SEQ ID NO: 30); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

479. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRSEDNAVYYC (SEQ ID NO: 31); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

480. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRSEDNAVYYC (SEQ ID NO: 32); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

481. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid

sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRSEDVAVYYC (SEQ ID NO: 33); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

482. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 34); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

483. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 35); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

484. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of

YAQKFQGRVTITRDRSTSTAYMELRSLRSEDAMYYC (SEQ ID NO: 32); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

485. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRSEDNAVYYC (SEQ ID NO: 33); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

486. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRSEDNAVYYC (SEQ ID NO: 34); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

487. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRSEDNAVYYC (SEQ ID NO: 35); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

488. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining

regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 36); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

489. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 36); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

490. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 18); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

491. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG

(SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 37); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

492. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 38); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

493. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 39); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

494. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 40); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

495. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAMYCY (SEQ ID NO: 37); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

496. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAMYCY (SEQ ID NO: 38); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

497. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAMYCY (SEQ ID NO: 39); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

498. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid

sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 40); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

499. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 41); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

500. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 42); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

501. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of

YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 43); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

502. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 44); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

503. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 45); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

504. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 46); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

505. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining

regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAMYCY (SEQ ID NO: 41); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

506. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAMYCY (SEQ ID NO: 42); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

507. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 43); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

508. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG

(SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 44); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

509. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 45); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

510. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 46); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

511. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 47); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

512. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 48); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

513. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 49); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

514. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 50); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

515. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid

sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 47); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

516. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 48); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

517. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 49); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

518. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of

YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 50); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

519. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 139); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

520. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 139); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

521. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 18); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

522. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining

regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 37); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

523. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 38); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

524. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 39); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

525. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG

(SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 40); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

526. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV $SCKAS$ (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 37); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

527. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV $SCKAS$ (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 38); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

528. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV $SCKAS$ (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 39); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

529. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 40); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

530. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 41); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

531. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 42); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

532. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid

sequence of X_{HI} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{HI} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 43); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

533. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{HI} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{HI} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 44); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

534. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{HI} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{HI} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 45); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

535. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{HI} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{HI} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of

YAQKFQDRVITITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 46); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

536. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 41); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

537. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 42); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

538. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 43); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

539. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining

regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 44); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

540. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 45); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

541. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 46); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

542. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG

(SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 47); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

543. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 48); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

544. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 49); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

545. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 50); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

546. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 47); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

547. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 48); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

548. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 49); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

549. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid

sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 50); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

550. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 139); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

551. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 139); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

552. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of

YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 18); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

553. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 37); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

554. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 38); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

555. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 39); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

556. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining

regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 40); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

557. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 37); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

558. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 38); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

559. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGGLEWMG

(SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAMYCY (SEQ ID NO: 39); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

560. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 40); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

561. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAMYCY (SEQ ID NO: 41); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

562. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAMYCY (SEQ ID NO: 42); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

563. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 43); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

564. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 44); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

565. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 45); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

566. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid

sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 46); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

567. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAMYCY (SEQ ID NO: 41); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

568. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAMYCY (SEQ ID NO: 42); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

569. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of

YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 43); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

570. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 44); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

571. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 45); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

572. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 46); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

573. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining

regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 47); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

574. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 48); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

575. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 49); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

576. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG

(SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 50); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

577. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV $SCKAS$ (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 47); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

578. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV $SCKAS$ (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 48); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

579. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV $SCKAS$ (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 49); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

580. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 50); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

581. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 139); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

582. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 139); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19).

583. The antibody or antigen-binding fragment of any of embodiments 103-582, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1

comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVITTC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11).

584. The antibody or antigen-binding fragment of any of embodiments 103-582, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVITTC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11).

585. The antibody or antigen-binding fragment of any of embodiments 103-582, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11).

586. The antibody or antigen-binding fragment of any of embodiments 103-582, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVITTC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC

(SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11).

587. The antibody or antigen-binding fragment of any of embodiments 103-582, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11).

588. The antibody or antigen-binding fragment of any of embodiments 103-582, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11).

589. The antibody or antigen-binding fragment of any of embodiments 103-582, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11).

590. The antibody or antigen-binding fragment of any of embodiments 103-582, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL

complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVITTC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11).

591. The antibody or antigen-binding fragment of any of embodiments 103-582, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11).

592. The antibody or antigen-binding fragment of any of embodiments 103-582, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11).

593. The antibody or antigen-binding fragment of any of embodiments 103-582, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVITTC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL

FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11).

594. The antibody or antigen-binding fragment of any of embodiments 103-582, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11).

595. The antibody or antigen-binding fragment of any of embodiments 103-582, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11).

596. The antibody or antigen-binding fragment of any of embodiments 103-582, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11).

597. The antibody or antigen-binding fragment of any of embodiments 103-582, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11).

598. An antibody or an antigen-binding fragment thereof, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11).

599. An antibody or an antigen-binding fragment thereof, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11).

600. An antibody or an antigen-binding fragment thereof, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the

amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11).

601. An antibody or an antigen-binding fragment thereof, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11).

602. An antibody or an antigen-binding fragment thereof, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11).

603. An antibody or an antigen-binding fragment thereof, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11).

604. An antibody or an antigen-binding fragment thereof, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the

amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11).

605. An antibody or an antigen-binding fragment thereof, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11).

606. An antibody or an antigen-binding fragment thereof, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11).

607. An antibody or an antigen-binding fragment thereof, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11).

608. An antibody or an antigen-binding fragment thereof, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid

sequence of NIQMTQSPSAMSASVGDRVITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11).

609. An antibody or an antigen-binding fragment thereof, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11).

610. An antibody or an antigen-binding fragment thereof, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11).

611. An antibody or an antigen-binding fragment thereof, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11).

612. An antibody or an antigen-binding fragment thereof, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL

FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVITTC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11).

613. The antibody or antigen-binding fragment of any of embodiments 1-612, which specifically binds to CD47 and comprises a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein at least one of the following is satisfied: (1) VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); (2) VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and (3) VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

614. The antibody or antigen-binding fragment of any of embodiments 1-612, which specifically binds to CD47 and comprises a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein (1) VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); (2) VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and (3) VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

615. The antibody or antigen-binding fragment of any of embodiments 1-614, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein at least one of the following is satisfied: (1) VL CDR1 comprises the amino acid sequence of X_{C1} ASQDIHRYLS (SEQ ID NO: 62), wherein X_{C1} is K or R; (2) VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

616. The antibody or antigen-binding fragment of any of embodiments 1-614, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL

FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of X_{C1} ASQDIHRYLS (SEQ ID NO: 62), wherein X_{C1} is K or R; (2) VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

617. The antibody or antigen-binding fragment of any of embodiments 1-614, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein at least one of the following is satisfied: (1) VL CDR1 comprises the amino acid sequence of X_{C1} ASQDIHRYLS (SEQ ID NO: 62), wherein X_{C1} is K or R; (2) VL CDR2 comprises the amino acid sequence of $RX_{C2}X_{C3}$ RFVD (SEQ ID NO: 65), wherein X_{C2} is any amino acid with a polar or charged side chain, and X_{C3} is V, I, E, or S; and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

618. The antibody or antigen-binding fragment of embodiment 617, wherein X_{C2} is Y, E, or H.

619. The antibody or antigen-binding fragment of any of embodiments 615-618, wherein X_{C1} is R.

620. The antibody or antigen-binding fragment of any of embodiments 1-614, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); (2) VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

621. The antibody or antigen-binding fragment of any of embodiments 1-614, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID

NO: 66); (2) VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

622. The antibody or antigen-binding fragment of any of embodiments 1-614, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); (2) VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

623. The antibody or antigen-binding fragment of any of embodiments 1-614, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); (2) VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

624. The antibody or antigen-binding fragment of any of embodiments 1-614, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); (2) VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

625. The antibody or antigen-binding fragment of any of embodiments 1-614, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); (2) VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

626. The antibody or antigen-binding fragment of any of embodiments 1-614, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); (2) VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

627. The antibody or antigen-binding fragment of any of embodiments 1-614, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); (2) VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

628. The antibody or antigen-binding fragment of any of embodiments 1-614, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); (2) VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

629. The antibody or antigen-binding fragment of any of embodiments 1-614, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); (2) VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

630. The antibody or antigen-binding fragment of any of embodiments 1-614, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-

terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); (2) VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

631. The antibody or antigen-binding fragment of any of embodiments 1-614, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); (2) VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

632. The antibody or antigen-binding fragment of any of embodiments 1-614, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); (2) VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

633. The antibody or antigen-binding fragment of any of embodiments 1-614, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); (2) VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

634. The antibody or antigen-binding fragment of any of embodiments 1-614, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID

NO: 79); (2) VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

635. The antibody or antigen-binding fragment of any of embodiments 1-614, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); (2) VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

636. The antibody or antigen-binding fragment of any of embodiments 1-614, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); (2) VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

637. The antibody or antigen-binding fragment of any of embodiments 1-614, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); (2) VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

638. The antibody or antigen-binding fragment of any of embodiments 1-614, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); (2) VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

639. The antibody or antigen-binding fragment of any of embodiments 1-614, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); (2) VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

640. The antibody or antigen-binding fragment of any of embodiments 1-614, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); (2) VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

641. The antibody or antigen-binding fragment of any of embodiments 1-614, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); (2) VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

642. The antibody or antigen-binding fragment of any of embodiments 1-614, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); (2) VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

643. The antibody or antigen-binding fragment of any of embodiments 1-614, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-

terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); (2) VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

644. The antibody or antigen-binding fragment of any of embodiments 1-614, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); (2) VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

645. The antibody or antigen-binding fragment of any of embodiments 1-614, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); (2) VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

646. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL CDR2 comprises the amino acid sequence of $RX_{C2}X_{C3}RFVD$ (SEQ ID NO: 65), wherein X_{C2} is any amino acid with a polar or charged side chain, and X_{C3} is V, I, E, or S.

647. The antibody or antigen-binding fragment of embodiment 646, wherein X_{C2} is Y, E, or H.

648. The antibody or antigen-binding fragment of embodiment 646, wherein X_{C2} is Y and X_{C3} is V.

649. The antibody or antigen-binding fragment of embodiment 646, wherein X_{C2} is Y and X_{C3} is I.

650. The antibody or antigen-binding fragment of embodiment 646, wherein X_{C2} is Y and X_{C3} is E.

651. The antibody or antigen-binding fragment of embodiment 646, wherein X_{C2} is Y and X_{C3} is S.

652. The antibody or antigen-binding fragment of embodiment 646, wherein X_{C2} is E and X_{C3} is V.

653. The antibody or antigen-binding fragment of embodiment 646, wherein X_{C2} is E and X_{C3} is I.

654. The antibody or antigen-binding fragment of embodiment 646, wherein X_{C2} is E and X_{C3} is E.

655. The antibody or antigen-binding fragment of embodiment 646, wherein X_{C2} is E and X_{C3} is S.

656. The antibody or antigen-binding fragment of embodiment 646, wherein X_{C2} is H and X_{C3} is V.

657. The antibody or antigen-binding fragment of embodiment 646, wherein X_{C2} is H and X_{C3} is I.

658. The antibody or antigen-binding fragment of embodiment 646, wherein X_{C2} is H and X_{C3} is E.

659. The antibody or antigen-binding fragment of embodiment 646, wherein X_{C2} is H and X_{C3} is S.

660. The antibody or antigen-binding fragment of any of embodiments 646-659, wherein VL CDR1 comprises the amino acid sequence of X_{C1} ASQDIHRYLS (SEQ ID NO: 62), wherein X_{C1} is K or R.

661. The antibody or antigen-binding fragment of embodiment 660, wherein X_{C1} is R.

662. The antibody or antigen-binding fragment of any of embodiments 646-661, wherein VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

663. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein

(1) VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); (2) VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

664. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); (2) VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

665. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); (2) VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

666. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); (2) VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

667. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); (2) VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

668. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); (2) VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

669. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); (2) VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

670. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); (2) VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

671. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); (2) VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

672. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-

terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); (2) VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

673. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); (2) VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

674. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); (2) VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

675. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); (2) VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

676. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); (2)

VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

677. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); (2) VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

678. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); (2) VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

679. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); (2) VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

680. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); (2) VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

681. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); (2) VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

682. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); (2) VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

683. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); (2) VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

684. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); (2) VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

685. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-

terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); (2) VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

686. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); (2) VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

687. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 14); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

688. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGGGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 14); and VH FR4

comprises the amino acid sequence of WGQGTTVTSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

689. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 18); and VH FR4 comprises the amino acid sequence of WGQGTTVTSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

690. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 14); and VH FR4 comprises the amino acid sequence of WGQGTLLVTSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

691. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH

FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 14); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

692. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAEDAMYYC (SEQ ID NO: 18); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

693. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 14); and VH FR4 comprises the amino acid sequence of WGQGTTLTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises

the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

694. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 18); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

695. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRSED TAMY YC (SEQ ID NO: 14); and VH FR4 comprises the amino acid sequence of WGQGT LVT VSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

696. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M

or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 18); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

697. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 18); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

698. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRSED TAMYYC (SEQ ID NO: 14); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

699. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 18); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

700. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 18); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

701. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of

YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 18); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

702. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 14); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

703. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 22); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

704. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining

regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRSEDAMYYC (SEQ ID NO: 23); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

705. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRSEDAMYYC (SEQ ID NO: 24); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

706. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 25); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1

comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

707. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRSEDTAMYYC (SEQ ID NO: 22); and VH FR4 comprises the amino acid sequence of WGQGTTVT VSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

708. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRSEDTAMYYC (SEQ ID NO: 23); and VH FR4 comprises the amino acid sequence of WGQGTTVT VSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

709. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid

sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRSEDAMYYC (SEQ ID NO: 24); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

710. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 25); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

711. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRSEDAMYYC (SEQ ID NO: 26); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises

the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

712. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRSED TAMY YC (SEQ ID NO: 27); and VH FR4 comprises the amino acid sequence of WGQGTTVT VSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

713. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRSED TAV Y YC (SEQ ID NO: 28); and VH FR4 comprises the amino acid sequence of WGQGTTVT VSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

714. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M

or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRSEDAMYYC (SEQ ID NO: 29); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

715. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRSED TAVYYC (SEQ ID NO: 30); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

716. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRSED TAVYYC (SEQ ID NO: 31); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

717. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of **X_{H1}**QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein **X_{H1}** is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRSEDAMYYC (SEQ ID NO: 26); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

718. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of **X_{H1}**QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein **X_{H1}** is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRSEDAMYYC (SEQ ID NO: 27); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

719. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of **X_{H1}**QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein **X_{H1}** is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of

YAQKFQGRVTITRDRSMSTAYMELSSLRSEDVAVYYC (SEQ ID NO: 28); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

720. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 29); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

721. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRSEDVAVYYC (SEQ ID NO: 30); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

722. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining

regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 31); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

723. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 32); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

724. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRSEDVAVYYC (SEQ ID NO: 33); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1

comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

725. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRSED TAVYYC (SEQ ID NO: 34); and VH FR4 comprises the amino acid sequence of WGQGTTVT VSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

726. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRSED TAVYYC (SEQ ID NO: 35); and VH FR4 comprises the amino acid sequence of WGQGTTVT VSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

727. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid

sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRSEDAMYYC (SEQ ID NO: 32); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

728. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRSEDATVYYC (SEQ ID NO: 33); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

729. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRSEDATVYYC (SEQ ID NO: 34); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises

the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

730. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRSED TAVYYC (SEQ ID NO: 35); and VH FR4 comprises the amino acid sequence of WGQGTTVT VSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

731. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRSED TAVYYC (SEQ ID NO: 36); and VH FR4 comprises the amino acid sequence of WGQGTTVT VSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

732. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M

or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRSED TAVYYC (SEQ ID NO: 36); and VH FR4 comprises the amino acid sequence of WGQGTTVT VSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

733. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRSED TAMY YC (SEQ ID NO: 14); and VH FR4 comprises the amino acid sequence of WGQGTTVT VSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

734. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRSED TAMY YC (SEQ ID NO: 22); and VH FR4 comprises the amino acid sequence of WGQGTTVT VSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

735. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRSEDAMYYC (SEQ ID NO: 23); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

736. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRSEDAMYYC (SEQ ID NO: 24); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

737. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of

YAQKFQDRVTITRDRSMSTAYMELSSLRSED TAVYYC (SEQ ID NO: 25); and VH FR4 comprises the amino acid sequence of WGQGTTVT VSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

738. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRSED TAMY YC (SEQ ID NO: 22); and VH FR4 comprises the amino acid sequence of WGQGTTVT VSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

739. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRSED TAMY YC (SEQ ID NO: 23); and VH FR4 comprises the amino acid sequence of WGQGTTVT VSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

740. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining

regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRSEDAMYYC (SEQ ID NO: 24); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

741. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 25); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

742. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTAYMELSSLRSEDAMYYC (SEQ ID NO: 26); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1

comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

743. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRSED TAMY YC (SEQ ID NO: 27); and VH FR4 comprises the amino acid sequence of WGQGTTVT VSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

744. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRSED TAV Y YC (SEQ ID NO: 28); and VH FR4 comprises the amino acid sequence of WGQGTTVT VSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

745. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid

sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRSEDAMYYC (SEQ ID NO: 29); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

746. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRSEDATVYYC (SEQ ID NO: 30); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

747. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRSEDATVYYC (SEQ ID NO: 31); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises

the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

748. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRSED TAMY YC (SEQ ID NO: 26); and VH FR4 comprises the amino acid sequence of WGQGTTVT VSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

749. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRSED TAMY YC (SEQ ID NO: 27); and VH FR4 comprises the amino acid sequence of WGQGTTVT VSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

750. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M

or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRSEDVAVYYC (SEQ ID NO: 28); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

751. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTAYMELSLRSEDVAVYYC (SEQ ID NO: 29); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

752. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTAYMELSSLRSEDVAVYYC (SEQ ID NO: 30); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

753. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 31); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

754. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRSEDVAMY YC (SEQ ID NO: 32); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

755. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of

YAQKFQGRVTITRDRSTSTAYMELSSLRSEDVAVYYC (SEQ ID NO: 33); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMDDY (SEQ ID NO: 61).

756. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 34); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMDDY (SEQ ID NO: 61).

757. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 35); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMDDY (SEQ ID NO: 61).

758. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining

regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAKKFQGRVTITRDRSTSTAYMELRSLRSEDAMYYC (SEQ ID NO: 32); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

759. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAKKFQGRVTITRDRSTSTAYMELSSLRSED TAVYYC (SEQ ID NO: 33); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

760. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAKKFQGRVTITRDRSMSTAYMELRSLRSED TAVYYC (SEQ ID NO: 34); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1

comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

761. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRSEDYAVYYC (SEQ ID NO: 35); and VH FR4 comprises the amino acid sequence of WGQGTTVTSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

762. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRSEDYAVYYC (SEQ ID NO: 36); and VH FR4 comprises the amino acid sequence of WGQGTTVTSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

763. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid

sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 36); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

764. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 18); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

765. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 37); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises

the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

766. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAMY YC (SEQ ID NO: 38); and VH FR4 comprises the amino acid sequence of WGQGTTVT VSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

767. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAMY YC (SEQ ID NO: 39); and VH FR4 comprises the amino acid sequence of WGQGTTVT VSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

768. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M

or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 40); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

769. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 37); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

770. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 38); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

771. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAMYCY (SEQ ID NO: 39); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

772. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSSLRAEDTAVYYC (SEQ ID NO: 40); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

773. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of

YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAMYCY (SEQ ID NO: 41); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

774. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSC KAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAMYCY (SEQ ID NO: 42); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

775. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSC KAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 43); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

776. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining

regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 44); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

777. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 45); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

778. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 46); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1

comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

779. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAMY YC (SEQ ID NO: 41); and VH FR4 comprises the amino acid sequence of WGQGTTVT VSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

780. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAMY YC (SEQ ID NO: 42); and VH FR4 comprises the amino acid sequence of WGQGTTVT VSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

781. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid

sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 43); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

782. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 44); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

783. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 45); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises

the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

784. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 46); and VH FR4 comprises the amino acid sequence of WGQGTTVT VSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

785. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 47); and VH FR4 comprises the amino acid sequence of WGQGTTVT VSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

786. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M

or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 48); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

787. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 49); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

788. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 50); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

789. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of **X_{H1}**QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein **X_{H1}** is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 47); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

790. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of **X_{H1}**QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein **X_{H1}** is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 48); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

791. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of **X_{H1}**QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein **X_{H1}** is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of

YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 49); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

792. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 50); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

793. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 139); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

794. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining

regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 139); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

795. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRSED TAMY YC (SEQ ID NO: 14); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

796. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRSED TAMY YC (SEQ ID NO: 22); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1

comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

797. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRSED TAMY YC (SEQ ID NO: 23); and VH FR4 comprises the amino acid sequence of WGQGTLVT VSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

798. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRSED TAMY YC (SEQ ID NO: 24); and VH FR4 comprises the amino acid sequence of WGQGTLVT VSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

799. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid

sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRSEDVAVYYC (SEQ ID NO: 25); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

800. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRSEDVAMYCY (SEQ ID NO: 22); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

801. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRSEDVAMYCY (SEQ ID NO: 23); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises

the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

802. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRSED TAMY YC (SEQ ID NO: 24); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

803. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRSED TAV Y YC (SEQ ID NO: 25); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

804. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M

or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRSEDAMYYC (SEQ ID NO: 26); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

805. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRSEDAMYYC (SEQ ID NO: 27); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

806. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 28); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

807. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of **X_{H1}**QMQLVQSGAEVKKTGSSVKVSCCKAS (SEQ ID NO: 12), wherein **X_{H1}** is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRSEDAMYYC (SEQ ID NO: 29); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMDDY (SEQ ID NO: 61).

808. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of **X_{H1}**QMQLVQSGAEVKKTGSSVKVSCCKAS (SEQ ID NO: 12), wherein **X_{H1}** is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRSEDAMYYC (SEQ ID NO: 30); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMDDY (SEQ ID NO: 61).

809. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of **X_{H1}**QMQLVQSGAEVKKTGSSVKVSCCKAS (SEQ ID NO: 12), wherein **X_{H1}** is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of

YAQKFQDRVITITRDRSMSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 31); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

810. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRSEDVAVYYC (SEQ ID NO: 26); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

811. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 27); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

812. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining

regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRSEDNAVYYC (SEQ ID NO: 28); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

813. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRSEDNAVYYC (SEQ ID NO: 29); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

814. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRSEDNAVYYC (SEQ ID NO: 30); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1

comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

815. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRSED TAVYYC (SEQ ID NO: 31); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

816. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRSED TAMY YC (SEQ ID NO: 32); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

817. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid

sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRSEDVAVYYC (SEQ ID NO: 33); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

818. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 34); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

819. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 35); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises

the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

820. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRSED TAMY YC (SEQ ID NO: 32); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

821. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRSED TAV Y YC (SEQ ID NO: 33); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

822. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M

or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRSED TAVYYC (SEQ ID NO: 34); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

823. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRSED TAVYYC (SEQ ID NO: 35); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

824. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRSED TAVYYC (SEQ ID NO: 36); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

825. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 36); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

826. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRSEDVAMYYC (SEQ ID NO: 14); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

827. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of

YAQKFQGRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 22); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

828. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRSEDAMYYC (SEQ ID NO: 23); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

829. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRSEDAMYYC (SEQ ID NO: 24); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

830. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining

regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRSEDNAVYYC (SEQ ID NO: 25); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

831. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRSEDNAVYYC (SEQ ID NO: 22); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

832. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRSEDNAVYYC (SEQ ID NO: 23); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1

comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

833. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRSED TAMY YC (SEQ ID NO: 24); and VH FR4 comprises the amino acid sequence of WGQGTTVT VSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

834. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRSED TAV Y YC (SEQ ID NO: 25); and VH FR4 comprises the amino acid sequence of WGQGTTVT VSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

835. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid

sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRSEDAMYYC (SEQ ID NO: 26); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

836. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRSEDAMYYC (SEQ ID NO: 27); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

837. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 28); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises

the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

838. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRSED TAMY YC (SEQ ID NO: 29); and VH FR4 comprises the amino acid sequence of WGQGTTVT VSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

839. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRSED TAV Y YC (SEQ ID NO: 30); and VH FR4 comprises the amino acid sequence of WGQGTTVT VSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

840. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M

or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 31); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

841. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRSEDVAMY YC (SEQ ID NO: 26); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

842. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRSEDVAMY YC (SEQ ID NO: 27); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

843. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of **X_{H1}**QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein **X_{H1}** is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRSEDVAVYYC (SEQ ID NO: 28); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

844. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of **X_{H1}**QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein **X_{H1}** is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 29); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

845. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of **X_{H1}**QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein **X_{H1}** is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of

YAQKFQDRVTITRDRSTSTAYMELSSLRSEDNAVYYC (SEQ ID NO: 30); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

846. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRSEDNAVYYC (SEQ ID NO: 31); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

847. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRSEDNAVYYC (SEQ ID NO: 32); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

848. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining

regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRSEDVAVYYC (SEQ ID NO: 33); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

849. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 34); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

850. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 35); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1

comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

851. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRSED TAMY YC (SEQ ID NO: 32); and VH FR4 comprises the amino acid sequence of WGQGTTVT VSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

852. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRSED TAV Y YC (SEQ ID NO: 33); and VH FR4 comprises the amino acid sequence of WGQGTTVT VSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

853. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid

sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 34); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

854. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 35); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

855. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 36); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises

the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

856. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRSED TAVYYC (SEQ ID NO: 36); and VH FR4 comprises the amino acid sequence of WGQGTTVT VSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

857. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAED TAMY YC (SEQ ID NO: 18); and VH FR4 comprises the amino acid sequence of WGQGTTVT VSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

858. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M

or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 37); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

859. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 38); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

860. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 39); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

861. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of **X_{H1}**QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein **X_{H1}** is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 40); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

862. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of **X_{H1}**QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein **X_{H1}** is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 37); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

863. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of **X_{H1}**QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein **X_{H1}** is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of

YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAMYCY (SEQ ID NO: 38); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMY (SEQ ID NO: 61).

864. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAMYCY (SEQ ID NO: 39); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMY (SEQ ID NO: 61).

865. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAVYCY (SEQ ID NO: 40); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMY (SEQ ID NO: 61).

866. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining

regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAMYCY (SEQ ID NO: 41); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

867. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAMYCY (SEQ ID NO: 42); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

868. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 43); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1

comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

869. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 44); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

870. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 45); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

871. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid

sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 46); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

872. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 41); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

873. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 42); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises

the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

874. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 43); and VH FR4 comprises the amino acid sequence of WGQGTTVT VSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

875. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 44); and VH FR4 comprises the amino acid sequence of WGQGTTVT VSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

876. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M

or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 45); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

877. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 46); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

878. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 47); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

879. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 48); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

880. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 49); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

881. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of

YAQKFQDRVITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 50); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

882. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 47); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

883. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 48); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

884. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining

regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 49); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

885. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 50); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

886. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 139); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1

comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

887. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 139); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

888. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRSED TAMY YC (SEQ ID NO: 14); and VH FR4 comprises the amino acid sequence of WGQGT LVT VSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

889. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid

sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 22); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

890. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRSEDAMYYC (SEQ ID NO: 23); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

891. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRSEDAMYYC (SEQ ID NO: 24); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises

the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

892. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRSED TAVYYC (SEQ ID NO: 25); and VH FR4 comprises the amino acid sequence of WGQGTLVT VSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

893. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRSED TAMY YC (SEQ ID NO: 22); and VH FR4 comprises the amino acid sequence of WGQGTLVT VSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

894. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M

or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRSEDAMYYC (SEQ ID NO: 23); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

895. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRSEDAMYYC (SEQ ID NO: 24); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

896. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 25); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

897. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRSEDAMYYC (SEQ ID NO: 26); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

898. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRSEDAMYYC (SEQ ID NO: 27); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

899. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of

YAQKFQGRVTITRDRSMSTAYMELSSLRSEDVAVYYC (SEQ ID NO: 28); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

900. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 29); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

901. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRSEDVAVYYC (SEQ ID NO: 30); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

902. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining

regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRSED TAVYYC (SEQ ID NO: 31); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

903. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRSED TAMY YC (SEQ ID NO: 26); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

904. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRSED TAMY YC (SEQ ID NO: 27); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1

comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

905. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRSEDTAVYYC (SEQ ID NO: 28); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

906. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRSEDTAMYYC (SEQ ID NO: 29); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

907. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid

sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRSEDVAVYYC (SEQ ID NO: 30); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

908. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 31); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

909. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 32); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises

the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

910. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRSED TAVYYC (SEQ ID NO: 33); and VH FR4 comprises the amino acid sequence of WGQGTLVT VSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

911. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRSED TAVYYC (SEQ ID NO: 34); and VH FR4 comprises the amino acid sequence of WGQGTLVT VSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

912. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M

or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 35); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

913. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 32); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

914. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRSEDVAVYYC (SEQ ID NO: 33); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

915. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 34); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

916. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 35); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

917. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of

YAQKFQGRVTITRDRSTSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 36); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

918. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 36); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

919. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 18); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

920. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining

regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 37); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

921. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 38); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

922. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 39); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1

comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

923. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 40); and VH FR4 comprises the amino acid sequence of WGQGTTVT VSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

924. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 37); and VH FR4 comprises the amino acid sequence of WGQGTTVT VSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

925. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid

sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 38); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

926. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 39); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

927. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 40); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises

the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

928. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAMY YC (SEQ ID NO: 41); and VH FR4 comprises the amino acid sequence of WGQGTTVT VSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

929. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAMY YC (SEQ ID NO: 42); and VH FR4 comprises the amino acid sequence of WGQGTTVT VSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

930. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M

or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 43); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

931. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 44); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

932. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 45); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

933. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of **X_{H1}**QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein **X_{H1}** is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 46); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

934. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of **X_{H1}**QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein **X_{H1}** is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 41); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

935. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of **X_{H1}**QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein **X_{H1}** is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of

YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAMYCY (SEQ ID NO: 42); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMY (SEQ ID NO: 61).

936. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSRAEDTAVYYC (SEQ ID NO: 43); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMY (SEQ ID NO: 61).

937. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAMYCY (SEQ ID NO: 44); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMY (SEQ ID NO: 61).

938. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining

regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 45); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

939. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 46); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

940. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 47); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1

comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

941. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 48); and VH FR4 comprises the amino acid sequence of WGQGTTVT VSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

942. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 49); and VH FR4 comprises the amino acid sequence of WGQGTTVT VSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

943. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid

sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 50); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

944. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 47); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

945. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 48); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises

the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

946. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 49); and VH FR4 comprises the amino acid sequence of WGQGTTVT VSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

947. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 50); and VH FR4 comprises the amino acid sequence of WGQGTTVT VSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

948. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M

or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 139); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

949. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 139); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

950. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRSED TAMY YC (SEQ ID NO: 14); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

951. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of **X_{H1}**QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein **X_{H1}** is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 22); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

952. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of **X_{H1}**QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein **X_{H1}** is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRSEDAMYYC (SEQ ID NO: 23); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

953. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of **X_{H1}**QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein **X_{H1}** is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of

YAQKFQDRVTITRDRSMSTAYMELRSLRSEDAMYYC (SEQ ID NO: 24); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

954. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 25); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

955. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 22); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

956. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining

regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRSEDAMYYC (SEQ ID NO: 23); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

957. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRSEDAMYYC (SEQ ID NO: 24); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

958. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 25); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1

comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

959. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRSED TAMY YC (SEQ ID NO: 26); and VH FR4 comprises the amino acid sequence of WGQGTLVT VSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

960. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRSED TAMY YC (SEQ ID NO: 27); and VH FR4 comprises the amino acid sequence of WGQGTLVT VSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

961. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid

sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRSEDVAVYYC (SEQ ID NO: 28); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

962. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 29); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

963. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRSEDVAVYYC (SEQ ID NO: 30); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises

the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

964. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRSED TAVYYC (SEQ ID NO: 31); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

965. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRSED TAMY YC (SEQ ID NO: 26); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

966. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M

or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRSEDAMYYC (SEQ ID NO: 27); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

967. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRSED AVYYC (SEQ ID NO: 28); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

968. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRSEDAMYYC (SEQ ID NO: 29); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

969. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRSEDVAVYYC (SEQ ID NO: 30); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

970. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRSEDVAVYYC (SEQ ID NO: 31); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

971. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of

YAQKFQGRVTITRDRSTSTAYMELRSLRSEDAMYYC (SEQ ID NO: 32); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

972. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRSEDAMYYC (SEQ ID NO: 33); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

973. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRSEDAMYYC (SEQ ID NO: 34); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

974. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining

regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRSEDNAVYYC (SEQ ID NO: 35); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

975. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRSEDNAVYYC (SEQ ID NO: 32); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

976. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRSEDNAVYYC (SEQ ID NO: 33); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1

comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

977. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRSED TAVYYC (SEQ ID NO: 34); and VH FR4 comprises the amino acid sequence of WGQGTLVT VSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

978. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRSED TAVYYC (SEQ ID NO: 35); and VH FR4 comprises the amino acid sequence of WGQGTLVT VSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

979. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid

sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRSED TAVYYC (SEQ ID NO: 36); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

980. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRSED TAVYYC (SEQ ID NO: 36); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

981. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 18); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises

the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

982. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAMY YC (SEQ ID NO: 37); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

983. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAMY YC (SEQ ID NO: 38); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

984. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M

or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAMYCY (SEQ ID NO: 39); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

985. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 40); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

986. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAMYCY (SEQ ID NO: 37); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

987. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAMYCY (SEQ ID NO: 38); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

988. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAMYCY (SEQ ID NO: 39); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

989. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of

YAQKFQDRVITITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 40); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

990. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 41); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

991. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 42); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

992. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining

regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 43); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

993. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 44); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

994. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 45); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1

comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

995. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 46); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

996. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 41); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

997. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid

sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAMYCY (SEQ ID NO: 42); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

998. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 43); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

999. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAMYCY (SEQ ID NO: 44); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises

the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1000. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 45); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1001. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 46); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1002. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M

or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 47); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1003. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 48); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1004. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 49); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1005. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of **X_{H1}**QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein **X_{H1}** is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 50); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1006. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of **X_{H1}**QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein **X_{H1}** is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 47); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1007. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of **X_{H1}**QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein **X_{H1}** is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of

YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 48); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

1008. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 49); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

1009. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 50); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

1010. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining

regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 139); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1011. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQALEWMG (SEQ ID NO: 17); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 139); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1012. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSSLRAEDTAMYYC (SEQ ID NO: 18); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1

comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1013. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 37); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1014. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 38); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1015. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid

sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAMYCY (SEQ ID NO: 39); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMY (SEQ ID NO: 61).

1016. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 40); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMY (SEQ ID NO: 61).

1017. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAMYCY (SEQ ID NO: 37); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises

the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1018. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAMY YC (SEQ ID NO: 38); and VH FR4 comprises the amino acid sequence of WGQGTTVT VSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1019. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAMY YC (SEQ ID NO: 39); and VH FR4 comprises the amino acid sequence of WGQGTTVT VSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1020. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M

or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 40); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1021. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 41); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1022. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 42); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1023. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 43); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1024. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 44); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1025. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of

YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 45); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

1026. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 46); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

1027. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 41); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

1028. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining

regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAMYCY (SEQ ID NO: 42); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1029. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 43); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1030. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTAYMELRSLRAEDTAMYCY (SEQ ID NO: 44); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1

comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1031. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 45); and VH FR4 comprises the amino acid sequence of WGQGTTVT VSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1032. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 46); and VH FR4 comprises the amino acid sequence of WGQGTTVT VSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1033. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid

sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 47); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1034. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 48); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1035. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 49); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises

the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1036. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 50); and VH FR4 comprises the amino acid sequence of WGQGTTVT VSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1037. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 47); and VH FR4 comprises the amino acid sequence of WGQGTTVT VSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1038. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M

or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 48); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

1039. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 49); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

1040. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 50); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

1041. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of **X_{H1}**QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein **X_{H1}** is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 139); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1042. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of **X_{H1}**QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein **X_{H1}** is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 139); and VH FR4 comprises the amino acid sequence of WGQGTTVTVSS (SEQ ID NO: 15); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1043. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of **X_{H1}**QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein **X_{H1}** is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of

YAQKFQDRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 14); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

1044. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 22); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

1045. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRSEDAMYYC (SEQ ID NO: 23); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

1046. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining

regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRSEDAMYYC (SEQ ID NO: 24); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1047. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 25); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1048. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 22); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1

comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1049. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRSED TAMY YC (SEQ ID NO: 23); and VH FR4 comprises the amino acid sequence of WGQGTLVT VSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1050. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRSED TAMY YC (SEQ ID NO: 24); and VH FR4 comprises the amino acid sequence of WGQGTLVT VSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1051. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid

sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRSEDVAVYYC (SEQ ID NO: 25); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

1052. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRSEDVAMYYC (SEQ ID NO: 26); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

1053. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRSEDVAMYYC (SEQ ID NO: 27); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises

the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1054. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRSED TAVYYC (SEQ ID NO: 28); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1055. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRSED TAMY YC (SEQ ID NO: 29); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1056. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M

or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRSEDNAVYYC (SEQ ID NO: 30); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1057. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRSEDNAVYYC (SEQ ID NO: 31); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1058. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRSEDNAVYYC (SEQ ID NO: 26); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1059. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of **X_{H1}**QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein **X_{H1}** is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRSEDAMYYC (SEQ ID NO: 27); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1060. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of **X_{H1}**QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein **X_{H1}** is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRSEDAMYYC (SEQ ID NO: 28); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1061. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of **X_{H1}**QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein **X_{H1}** is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of

YAQKFQDRVTITRDRSTSTAYMELRSLRSEDAMYYC (SEQ ID NO: 29); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

1062. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRSEDAMYYC (SEQ ID NO: 30); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

1063. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRSEDAMYYC (SEQ ID NO: 31); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

1064. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining

regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRSEDAMYYC (SEQ ID NO: 32); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1065. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRSEDAMYYC (SEQ ID NO: 33); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1066. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRSEDAMYYC (SEQ ID NO: 34); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1

comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1067. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRSED TAVYYC (SEQ ID NO: 35); and VH FR4 comprises the amino acid sequence of WGQGTLVT VSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1068. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRSED TAMY YC (SEQ ID NO: 32); and VH FR4 comprises the amino acid sequence of WGQGTLVT VSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1069. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid

sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRSED TAVYYC (SEQ ID NO: 33); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1070. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRSED TAVYYC (SEQ ID NO: 34); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1071. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRSED TAVYYC (SEQ ID NO: 35); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises

the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1072. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRSED TAVYYC (SEQ ID NO: 36); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1073. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRSED TAVYYC (SEQ ID NO: 36); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1074. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M

or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 18); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1075. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 37); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1076. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 38); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1077. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of **X_{H1}**QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein **X_{H1}** is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAMYCY (SEQ ID NO: 39); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1078. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of **X_{H1}**QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein **X_{H1}** is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 40); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1079. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of **X_{H1}**QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein **X_{H1}** is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of

YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 37); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

1080. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 38); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

1081. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 39); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

1082. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining

regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 40); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1083. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 41); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1084. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 42); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1

comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1085. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 43); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1086. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 44); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1087. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid

sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 45); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

1088. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 46); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

1089. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 41); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises

the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1090. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAMY YC (SEQ ID NO: 42); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1091. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAV YYC (SEQ ID NO: 43); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1092. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M

or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 44); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

1093. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 45); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

1094. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 46); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

1095. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of **X_{H1}**QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein **X_{H1}** is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 47); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1096. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of **X_{H1}**QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein **X_{H1}** is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 48); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1097. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of **X_{H1}**QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein **X_{H1}** is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of

YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 49); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

1098. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 50); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

1099. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 47); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

1100. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining

regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 48); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1101. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 49); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1102. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 50); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1

comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1103. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 139); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1104. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKALEWMG (SEQ ID NO: 13); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 139); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1105. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid

sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 18); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

1106. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 37); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

1107. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 38); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises

the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1108. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAMY YC (SEQ ID NO: 39); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1109. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAV YYC (SEQ ID NO: 40); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1110. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M

or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 37); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1111. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 38); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1112. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 39); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1113. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of **X_{H1}**QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein **X_{H1}** is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 40); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1114. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of **X_{H1}**QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein **X_{H1}** is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 41); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1115. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of **X_{H1}**QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein **X_{H1}** is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of

YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAMYCY (SEQ ID NO: 42); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMY (SEQ ID NO: 61).

1116. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSRAEDTAVYYC (SEQ ID NO: 43); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMY (SEQ ID NO: 61).

1117. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAMYCY (SEQ ID NO: 44); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMY (SEQ ID NO: 61).

1118. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining

regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 45); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1119. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 46); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1120. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 41); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1

comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1121. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAMY YC (SEQ ID NO: 42); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1122. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 43); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1123. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid

sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 44); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

1124. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 45); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

1125. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 46); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises

the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1126. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 47); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1127. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 48); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1128. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M

or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 49); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1129. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 50); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1130. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 47); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1131. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 48); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1132. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 49); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1133. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of

YAQKFQDRVITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 50); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

1134. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 139); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

1135. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGQGLEWMG (SEQ ID NO: 16); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 139); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

1136. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining

regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 18); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1137. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 37); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1138. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 38); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1

comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1139. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAMY YC (SEQ ID NO: 39); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1140. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 40); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1141. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid

sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 37); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

1142. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 38); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

1143. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 39); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises

the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1144. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 40); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1145. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAMYYC (SEQ ID NO: 41); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1146. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M

or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAMYCY (SEQ ID NO: 42); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

1147. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 43); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

1148. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAMYCY (SEQ ID NO: 44); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

1149. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of **X_{H1}**QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein **X_{H1}** is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 45); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1150. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of **X_{H1}**QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein **X_{H1}** is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 46); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1151. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of **X_{H1}**QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein **X_{H1}** is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of

YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAMYCY (SEQ ID NO: 41); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1152. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAMYCY (SEQ ID NO: 42); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1153. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 43); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1154. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining

regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 44); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1155. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 45); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1156. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 46); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1

comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1157. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 47); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1158. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKV SCKAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 48); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1159. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid

sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 49); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

1160. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 50); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

1161. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAMYYC (SEQ ID NO: 47); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLYH (SEQ ID NO: 59); VH CDR2 comprises

the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1162. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELSSLRAEDTAVYYC (SEQ ID NO: 48); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1163. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSMSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 49); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDY YLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61).

1164. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKV SCKAS (SEQ ID NO: 21), wherein X_{H1} is M

or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQDRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 50); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

1165. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKTGSSVKVSCAS (SEQ ID NO: 12), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 139); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

1166. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence of X_{H1} QMQLVQSGAEVKKPGSSVKVSCAS (SEQ ID NO: 21), wherein X_{H1} is M or no amino acid; VH FR2 comprises the amino acid sequence of WVRQAPGKGLEWMG (SEQ ID NO: 20); VH FR3 comprises the amino acid sequence of YAQKFQGRVTITRDRSTSTAYMELRSLRAEDTAVYYC (SEQ ID NO: 139); and VH FR4 comprises the amino acid sequence of WGQGTLVTVSS (SEQ ID NO: 19); VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPMYD (SEQ ID NO: 61).

1167. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1168. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1169. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66);

VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1170. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1171. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1172. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC

(SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1173. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1174. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1175. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51);

VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1176. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1177. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1178. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal

order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1179. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1180. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1181. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1182. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1183. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79);

VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1184. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVITTC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1185. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVITTC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1186. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVITTC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC

(SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1187. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1188. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1189. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51);

VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1190. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1191. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1192. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal

order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1193. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1194. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1195. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLYI (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1196. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLYI (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1197. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLYI (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66);

VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1198. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1199. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1200. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC

(SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1201. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVITTC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1202. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVITTC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1203. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVITTC (SEQ ID NO: 53);

VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1204. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1205. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1206. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal

order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1207. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1208. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1209. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVITTC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLYI (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1210. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVITTC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLYI (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1211. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVITTC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLYI (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79);

VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1212. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1213. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1214. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC

(SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1215. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVITTC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1216. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVITTC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1217. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVITTC (SEQ ID NO: 53);

VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1218. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1219. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1220. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal

order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1221. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1222. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1223. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPTY (SEQ ID NO: 64).

1224. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPTY (SEQ ID NO: 64).

1225. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66);

VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1226. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1227. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1228. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC

(SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1229. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1230. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1231. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54);

VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1232. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1233. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1234. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal

order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1235. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1236. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1237. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1238. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1239. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79);

VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1240. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1241. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1242. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC

(SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1243. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1244. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1245. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51);

VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1246. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1247. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1248. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal

order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1249. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1250. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1251. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1252. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1253. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66);

VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1254. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1255. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1256. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC

(SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1257. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1258. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1259. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51);

VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1260. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1261. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1262. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal

order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1263. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1264. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1265. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1266. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1267. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79);

VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1268. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1269. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1270. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC

(SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1271. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1272. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1273. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51);

VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1274. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1275. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1276. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal

order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1277. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1278. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1279. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1280. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1281. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66);

VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1282. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVITTC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1283. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVITTC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1284. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVITTC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC

(SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1285. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1286. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1287. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51);

VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1288. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1289. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1290. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal

order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1291. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1292. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1293. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1294. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1295. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79);

VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1296. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1297. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1298. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC

(SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1299. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1300. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1301. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57);

VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1302. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1303. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1304. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal

order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1305. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1306. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1307. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPTY (SEQ ID NO: 64).

1308. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPTY (SEQ ID NO: 64).

1309. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66);

VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1310. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1311. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1312. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC

(SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1313. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1314. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1315. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57);

VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1316. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1317. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1318. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal

order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1319. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1320. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1321. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLYI (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1322. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLYI (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1323. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66);

VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1324. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1325. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1326. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC

(SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1327. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVITTC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1328. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVITTC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1329. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVITTC (SEQ ID NO: 53);

VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1330. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1331. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1332. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal

order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVITTC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1333. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVITTC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1334. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVITTC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1335. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1336. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1337. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79);

VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1338. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1339. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1340. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC

(SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1341. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVITTC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1342. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVITTC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1343. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVITTC (SEQ ID NO: 53);

VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1344. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1345. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1346. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal

order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVITTC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1347. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVITTC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1348. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVITTC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1349. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1350. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1351. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66);

VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1352. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1353. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1354. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC

(SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1355. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1356. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1357. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53);

VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1358. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1359. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1360. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal

order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVITTC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1361. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVITTC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1362. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVITTC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1363. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVITTC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1364. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVITTC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1365. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVITTC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79);

VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1366. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1367. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1368. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC

(SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1369. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVITTC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1370. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVITTC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1371. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVITTC (SEQ ID NO: 53);

VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1372. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1373. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1374. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal

order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1375. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1376. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1377. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1378. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1379. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66);

VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1380. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1381. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1382. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC

(SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1383. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1384. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1385. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54);

VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1386. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1387. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1388. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal

order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1389. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1390. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1391. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1392. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1393. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79);

VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1394. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1395. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1396. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC

(SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1397. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1398. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1399. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54);

VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1400. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1401. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1402. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal

order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1403. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1404. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1405. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1406. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1407. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66);

VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1408. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1409. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1410. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC

(SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1411. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1412. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1413. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54);

VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1414. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1415. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1416. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal

order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1417. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1418. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1419. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1420. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1421. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79);

VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1422. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1423. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1424. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC

(SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1425. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1426. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1427. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51);

VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1428. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1429. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1430. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal

order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1431. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1432. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1433. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1434. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1435. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66);

VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1436. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVITTC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1437. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVITTC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1438. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVITTC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC

(SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1439. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1440. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1441. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51);

VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1442. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVITTC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1443. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVITTC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1444. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal

order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1445. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1446. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1447. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1448. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1449. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79);

VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1450. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVITTC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1451. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVITTC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1452. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVITTC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC

(SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1453. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1454. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1455. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57);

VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1456. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1457. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1458. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal

order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1459. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1460. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1461. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1462. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1463. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66);

VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1464. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVITTC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1465. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVITTC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1466. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVITTC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC

(SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1467. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1468. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1469. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57);

VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1470. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1471. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1472. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal

order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1473. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1474. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1475. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1476. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1477. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79);

VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1478. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1479. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1480. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC

(SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1481. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1482. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1483. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57);

VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1484. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1485. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1486. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal

order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1487. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1488. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1489. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1490. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1491. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66);

VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1492. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1493. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1494. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC

(SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1495. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1496. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1497. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57);

VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1498. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1499. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1500. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal

order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1501. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1502. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1503. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1504. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1505. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66);

VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1506. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1507. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1508. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC

(SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1509. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1510. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REVERFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1511. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54);

VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1512. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1513. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1514. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal

order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1515. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1516. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1517. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1518. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1519. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79);

VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1520. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1521. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1522. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC

(SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1523. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1524. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1525. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54);

VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1526. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1527. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1528. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal

order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1529. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1530. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1531. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1532. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1533. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66);

VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1534. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1535. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1536. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC

(SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1537. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1538. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1539. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57);

VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1540. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1541. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1542. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal

order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1543. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1544. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1545. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1546. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1547. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79);

VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1548. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1549. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1550. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC

(SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1551. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1552. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1553. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57);

VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1554. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1555. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1556. The antibody or antigen-binding fragment of any of embodiments 687-1166, further comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal

order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1557. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1558. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid

sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1559. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1560. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1561. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID

NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1562. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1563. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1564. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1565. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1566. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of

GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1567. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1568. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1569. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three

VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1570. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1571. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino

acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1572. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1573. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1574. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein

VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1575. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1576. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid

sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1577. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1578. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1579. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID

NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1580. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1581. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1582. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1583. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1584. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of

GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1585. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1586. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1587. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three

VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1588. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1589. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino

acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1590. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1591. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1592. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein

VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1593. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1594. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid

sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1595. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1596. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1597. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID

NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1598. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1599. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1600. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1601. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1602. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of

GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1603. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1604. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1605. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three

VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1606. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1607. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino

acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1608. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1609. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1610. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein

VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1611. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1612. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid

sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1613. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1614. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1615. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID

NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1616. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1617. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1618. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1619. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1620. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of

GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1621. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1622. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1623. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three

VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1624. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1625. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino

acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1626. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1627. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1628. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein

VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1629. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1630. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid

sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1631. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1632. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1633. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID

NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1634. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1635. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVITTC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1636. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1637. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1638. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of

GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1639. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1640. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1641. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three

VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1642. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1643. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino

acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1644. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1645. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1646. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein

VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1647. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1648. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid

sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1649. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1650. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1651. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID

NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1652. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1653. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1654. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1655. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1656. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of

GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1657. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1658. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1659. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three

VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1660. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1661. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino

acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1662. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1663. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1664. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein

VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1665. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1666. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid

sequence of REVRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1667. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1668. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1669. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID

NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1670. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1671. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1672. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1673. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1674. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of

GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1675. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1676. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1677. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three

VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1678. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1679. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino

acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1680. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1681. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1682. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein

VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1683. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1684. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid

sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1685. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1686. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1687. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID

NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1688. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1689. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1690. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1691. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1692. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of

GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1693. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1694. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1695. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three

VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1696. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1697. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino

acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1698. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1699. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1700. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein

VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1701. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1702. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid

sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1703. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1704. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1705. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID

NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1706. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1707. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1708. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1709. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1710. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of

GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1711. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1712. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKVPKHLIY (SEQ ID NO: 52); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1713. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three

VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1714. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1715. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino

acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1716. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1717. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1718. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein

VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVITTC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1719. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVITTC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1720. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVITTC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid

sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1721. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1722. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1723. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID

NO: 53); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1724. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1725. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1726. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1727. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1728. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of

GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1729. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1730. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1731. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three

VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1732. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1733. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino

acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1734. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1735. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1736. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein

VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1737. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1738. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid

sequence of RHSRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1739. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1740. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1741. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID

NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1742. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1743. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1744. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1745. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1746. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of

GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1747. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1748. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1749. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three

VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1750. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1751. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino

acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1752. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1753. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1754. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein

VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVITTC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1755. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVITTC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1756. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVITTC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid

sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1757. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1758. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1759. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID

NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1760. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1761. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1762. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1763. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1764. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSMSASVGDRVTITC (SEQ ID NO: 53); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of

GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1765. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1766. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1767. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three

VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1768. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1769. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino

acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1770. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1771. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1772. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein

VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1773. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1774. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid

sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1775. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1776. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1777. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID

NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1778. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1779. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1780. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1781. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1782. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of

GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1783. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1784. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

1785. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three

VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1786. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1787. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino

acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1788. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGSGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1789. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGSGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1790. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein

VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1791. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1792. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid

sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1793. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1794. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1795. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID

NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1796. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1797. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1798. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1799. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1800. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of

GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1801. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1802. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1803. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three

VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1804. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1805. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino

acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1806. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1807. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1808. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein

VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1809. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1810. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid

sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1811. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1812. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1813. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID

NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1814. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1815. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1816. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1817. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVITTC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1818. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVITTC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of

GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1819. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1820. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1821. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three

VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1822. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1823. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino

acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1824. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1825. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1826. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein

VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1827. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1828. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid

sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1829. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1830. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1831. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID

NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1832. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1833. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1834. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1835. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1836. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of

GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1837. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1838. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1839. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three

VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1840. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1841. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVTITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino

acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1842. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSAMSASVGDRVITC (SEQ ID NO: 51); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1843. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1844. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein

VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1845. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1846. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid

sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1847. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1848. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1849. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID

NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1850. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1851. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1852. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1853. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1854. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLYI (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of

GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1855. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVITTC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1856. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVITTC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1857. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three

VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1858. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1859. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino

acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1860. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1861. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REYRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1862. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein

VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1863. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1864. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid

sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1865. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1866. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1867. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVITC (SEQ ID

NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1868. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKVPKHLIY (SEQ ID NO: 55); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1869. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1870. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1871. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1872. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of

GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1873. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVITTC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1874. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVITTC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1875. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three

VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVITTC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1876. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVITTC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1877. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVITTC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino

acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1878. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1879. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1880. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein

VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1881. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1882. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid

sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1883. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1884. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1885. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID

NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1886. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1887. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1888. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1889. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1890. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of

GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1891. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1892. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1893. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three

VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1894. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WFQQKPGKAPKHLIY (SEQ ID NO: 56); VL FR3 comprises the amino acid sequence of GVPSRFGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1895. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino

acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1896. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1897. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1898. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein

VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1899. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1900. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid

sequence of REVRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1901. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1902. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1903. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID

NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1904. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1905. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1906. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1907. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1908. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of

GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1909. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1910. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1911. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three

VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1912. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1913. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino

acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1914. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1915. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1916. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein

VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1917. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1918. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVTITC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid

sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1919. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1920. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSALSASVGDRVITTC (SEQ ID NO: 54); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1921. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVITTC (SEQ ID

NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1922. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1923. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1924. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1925. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1926. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of

GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1927. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVITTC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1928. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVITTC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1929. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three

VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFGSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1930. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFGSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1931. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFGSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino

acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1932. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1933. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 66); VL CDR2 comprises the amino acid sequence of RHRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1934. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein

VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1935. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYVRFVD (SEQ ID NO: 67); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1936. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid

sequence of RYIRFVD (SEQ ID NO: 68); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1937. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYERFVD (SEQ ID NO: 69); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1938. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RYSRFVD (SEQ ID NO: 70); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1939. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID

NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REVRFVD (SEQ ID NO: 71); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1940. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REIRFVD (SEQ ID NO: 72); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1941. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of REERFVD (SEQ ID NO: 73); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1942. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RESRFVD (SEQ ID NO: 74); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1943. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHVRFVD (SEQ ID NO: 75); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1944. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVTITC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of

GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHIRFVD (SEQ ID NO: 76); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1945. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVITTC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHERFVD (SEQ ID NO: 77); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1946. An antibody or an antigen-binding fragment thereof, which specifically binds to CD47, comprising a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence of NIQMTQSPSSLSASVGDRVITTC (SEQ ID NO: 57); VL FR2 comprises the amino acid sequence of WYQQKPGKAPKHLIY (SEQ ID NO: 58); VL FR3 comprises the amino acid sequence of GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and VL FR4 comprises the amino acid sequence of FGGGTKVEIK (SEQ ID NO: 11); VL CDR1 comprises the amino acid sequence of RASQDIHRYLS (SEQ ID NO: 79); VL CDR2 comprises the amino acid sequence of RHSRFVD (SEQ ID NO: 78); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

1947. The antibody or antigen-binding fragment of any of embodiments 1-1946, which comprises a heavy chain constant region.

1948. The antibody or antigen-binding fragment of embodiment 1947, wherein the heavy chain constant region is a human constant region.

1949. The antibody or antigen-binding fragment of embodiment 1947, wherein the heavy chain constant region is a human IgG constant region.

1950. The antibody or antigen-binding fragment of embodiment 1947, wherein the heavy chain constant region is a human IgG1 constant region.

1951. The antibody or antigen-binding fragment of embodiment 1947, wherein the heavy chain constant region is a human IgG4 constant region.

1952. The antibody or antigen-binding fragment of embodiment 1947, wherein the heavy chain constant region is a human IgG4 constant region comprising a S228P amino acid substitution according to the EU numbering index.

1953. The antibody or antigen-binding fragment of embodiment 1947, wherein the heavy chain constant region is a human IgG4 constant region comprising a S228P and L235E amino acid substitutions according to the EU numbering index.

1954. The antibody or antigen-binding fragment of any of embodiments 1-1953, which comprises a light chain constant region selected from the group consisting of a human kappa constant region and a human lambda constant region.

1955. The antibody or antigen-binding fragment of any of embodiments 1-1946, wherein the antigen-binding fragment is an Fv, Fab, F(ab')₂, Fab', dsFv, scFv, or sc(Fv)₂.

1956. The antibody or antigen-binding fragment of any of embodiments 1-1955, wherein the antibody is a human antibody, a humanized antibody, a chimeric antibody, a recombinant antibody, a multispecific antibody, or an antigen-binding fragment thereof.

1957. The antibody or antigen-binding fragment of any of embodiments 1-1956, wherein the antibody is a monoclonal antibody or antigen-binding fragment thereof.

1958. The antibody or antigen-binding fragment of any of embodiments 1-1957, wherein the antibody or antigen-binding fragment thereof is an antibody.

1959. The antibody or antigen-binding fragment of any of embodiments 1-1958, which is conjugated to an agent.

1960. The antibody or antigen-binding fragment of embodiment 1959, wherein the agent is a label or a toxin.

1961. A pharmaceutical composition comprising a therapeutically effective amount of the antibody or antigen-binding fragment of any of embodiments 1-1960, and a pharmaceutically acceptable carrier.

1962. A polynucleotide comprising a nucleotide sequence encoding the antibody or antigen-binding fragment of any of embodiments 1-1960.

1963. A vector comprising the polynucleotide of embodiment 1962.

1964. A method of treating cancer in a subject in need thereof, the method comprising administering to the subject the antibody or antigen-binding fragment of any of embodiments 1-1960 or the pharmaceutical composition of embodiment 1961.

1965. A method of alleviating a symptom of a cancer in a subject in need thereof, the method comprising administering to the subject the antibody or antigen-binding fragment of any of embodiments 1-1960 or the pharmaceutical composition of embodiment 1961.

1966. The method of embodiment 1964 or 1965, further comprising administering to the subject radiotherapy or chemotherapy.

1967. The method of any of embodiments 1964-1966, further comprising administering to the subject another anti-cancer agent.

1968. The method of any of embodiments 1964-1967, wherein the cancer is a hematological cancer.

1969. The method of any of embodiments 1964-1967, wherein the cancer is a solid cancer.

1970. The method of any of embodiments 1964-1967, wherein the cancer is multiple myeloma, non-Hodgkin's lymphoma, acute myeloid leukemia (AML), breast cancer, bladder cancer, non-small cell lung cancer/carcinoma, hepatocellular carcinoma (HCC), sarcoma, or head and neck cancer.

1971. An isolated cell comprising the polynucleotide of embodiment 1962.

1972. An isolated cell comprising the vector of embodiment 1963.

1973. An isolated cell producing the antibody or antigen-binding fragment of any of embodiments 1-1960.

1974. A method of making an antibody or antigen-binding fragment thereof, comprising (a) culturing an isolated cell comprising the polynucleotide of embodiment 1962; and (b) isolating the antibody or antigen-binding fragment thereof.

1975. A method of making an antibody or antigen-binding fragment thereof, comprising (a) culturing an isolated cell of any of embodiments 1971-1973; and (b) isolating the antibody or antigen-binding fragment thereof.

4. BRIEF DESCRIPTION OF THE FIGURES

[0057] **Figure 1.** Median staining of the matrixed variant transient transfection. At saturating conditions, all samples demonstrate binding to CD47 on CCRF CEM cells at equivalent or greater levels than the Ab_{Parental} antibody. Samples with titers below 10 μ g/mL, or the parental antibody CDR's grafted into the Herceptin LC frameworks (denoted by "Traz" or "50" (HC) and "56" (LC)—previously shown to be functionally compromised); and the LC's designated as Ab486, Ab495 and HC Ab170 appear to indicate some compromise in functionality. However, LC Ab486 was tested twice; thus demonstrating the unreliability of cell binding data at saturation. Therefore, only those molecules with the greatest *in silico* improvement in immunogenicity were purified (see Figure 2).

[0058] **Figure 2.** *In silico* immunogenicity heat map: VH and VL combinations are shaded (predicted lower immunogenicity) and pairs marked with an "x" were prioritized for purification.

[0059] **Figure 3.** Antibodies in Figure 2 were compared using cell binding and K_D's and EpiMatrix scores.

[0060] **Figure 4.** Cell binding data of a representative antibody.

[0061] **Figure 5.** Solubility assessment of representative antibodies in the absence and presence of sucrose.

[0062] **Figure 6.** Stability assessment of representative antibodies. Curves show melting peaks of the CH₂, CH₃ and Fab regions as indicated.

[0063] **Figure 7.** EpiMatrix Epx score scale.

5. DETAILED DESCRIPTION

[0064] Provided herein are antibodies and antigen-binding fragments thereof with low or no immunogenicity in humans additional desirable characteristics, *e.g.*, manufacturing, storage and formulation properties (*e.g.*, high solubility, high stability, and/or high expression levels). In

various aspects, the antibodies and antigen-binding fragments provided herein also have desirable antigen-binding affinities. Also provided are compositions comprising such antibodies, methods of using such antibodies, and methods for making such antibodies.

[0065] Immunogenicity

[0066] In various aspects, the antibodies or antigen-binding fragments thereof provided herein have low or no immunogenicity in humans, or have low or no immunogenicity potential in humans. An antibody or antigen-binding fragment thereof has “no” immunogenicity or “no” immunogenicity potential in humans if its EpiMatrix Epx score is equal to or lower than -40, based on EpiVax analysis (Koren, E., *et al.*, 2007, Clin Immunol 124(1):26-32; De Groot, A.S. and Martin, W., 2009, Clin Immunol 131(2):189-201; epivax.com/epimatrix; see Figure 7 for the EpiMatrix Epx score scale). Thus, the antibodies or antigen-binding fragments thereof do not or are less likely to provoke host immune responses in the human body directed against them, or produce or likely to produce low risk host immune responses in the human body directed against them (*e.g.*, having an immunogenic potential that is less than 7.5%, less than 5.0%, less than 2.0%, less than 1.5%, less than 1.0%, or preferably less than 0.5%) Immunogenicity or potential immunogenicity can be measured by any method known in the art for assessing immunogenicity of antibodies in humans, such as EpiVax analysis, EpibaseTM analysis, or anti-drug-antibody (ADA) assay In some embodiments, the antibodies or antigen-binding fragments thereof provided herein are tier II antibodies or antigen-binding fragments based on EpiVax analysis (*i.e.*, antibodies that contain low ratios of effector T cell epitopes and low ratios of regulatory T cell epitopes (see www.epivax.com/immunogenicity-screening/ispri-web-based-immunogenicity-screening/)). In other and embodiments, the antibodies or antigen-binding fragments thereof provided herein are tier I antibodies or antigen-binding fragments based on EpiVax analysis (*i.e.*, antibodies that contain low ratios of effector T cell epitopes and high ratios of regulatory T cell epitopes).

[0067] In specific embodiments, the antibodies or antigen-binding fragments thereof provided herein have an EpiMatrix Epx score that is equal to or lower than -20. In a specific embodiment, the antibodies or antigen-binding fragments thereof provided herein have an EpiMatrix Epx score that is equal to or lower than -25. In another specific embodiment, the antibodies or antigen-binding fragments thereof provided herein have an EpiMatrix Epx score

that is equal to or lower than -30. In another specific embodiment, the antibodies or antigen-binding fragments thereof provided herein have an EpMatrix Epx score that is equal to or lower than -35. In another specific embodiment, the antibodies or antigen-binding fragments thereof provided herein have an EpMatrix Epx score that is equal to or lower than -40. In another specific embodiment, the antibodies or antigen-binding fragments thereof provided herein have an EpMatrix Epx score that is equal to or lower than -45. In another specific embodiment, the antibodies or antigen-binding fragments thereof provided herein have an EpMatrix Epx score that is equal to or lower than -50. EpiMatrix is an *in silico* immunogenicity analysis platform developed by EpiVax (Koren, E., *et al.*, 2007, Clin Immunol 124(1):26-32; De Groot, A.S. and Martin, W., 2009, Clin Immunol 131(2):189-201; epivax.com/epimatrix).

[0068] In specific embodiments, the antibodies or antigen-binding fragments thereof provided herein are variants of a parental antibody or parental antigen-binding fragment (as the case may be) and have lower (*e.g.*, about 1.5-fold, 2-fold, 5-fold, 10-fold, 20-fold, 50-fold, 100-fold, 200-fold, 500-fold, or 1000-fold lower, or less) immunogenicity relative to the parental antibody or parental antigen-binding fragment (as the case may be). A variant of a parental antibody or parental antigen-binding fragment comprises the amino acid sequence of the parental antibody or parental antigen-binding fragment (as the case may be) with mutations (for example, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, or 20 mutations) introduced into one or more framework regions (FRs) and/or one or more complementarity determining regions (CDRs) while retaining the binding specificity of the parental antibody or parental antigen-binding fragment (as the case may be) to the antigen epitope. In one embodiment, a variant of a parental antibody or parental antigen-binding fragment comprises the amino acid sequence of the parental antibody or parental antigen-binding fragment (as the case may be) with mutations (for example, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, or 20 mutations) introduced into one or more framework regions (FRs) while retaining the binding specificity of the parental antibody or parental antigen-binding fragment (as the case may be) to the antigen epitope.

[0069] In a specific embodiment, the parental antibody or the parental antigen-binding fragment is an antibody that comprises a heavy chain variable region (VH) comprising the amino acid sequence of

QMQLVQSGAEVKKTGSSVKVSCKASGFNIKDYLLHWVRQAPGQALEWMGWIDPDQG

DTEYAQKFQDRVTITRDRSMSTAYMELSSLRSEDAMYYCNAAYGSSSYPM DYWGQG TTVTVSS (SEQ ID NO: 80), and a light chain variable region (VL) comprising the amino acid sequence of

NIQMTQSPSAMSASVGDRVTITCKASQDIHRYLSWFQQKPGKVPKHLIYRANRLVSGVP SRFSGSGSGTEFTLTISLQPEDFATYYCLQYDEFPYTFGGGTKVEIK (SEQ ID NO: 81), or

an antigen-binding fragment thereof (as the case may be). In another specific embodiment, the parental antibody or the parental antigen-binding fragment is an antibody that comprises a heavy chain comprising the amino acid sequence of

QMQLVQSGAEVKKTGSSVKVSCKASGFNIKDYHLHWVRQAPGQALEWMGWIDPDQG DTEYAQKFQDRVTITRDRSMSTAYMELSSLRSEDAMYYCNAAYGSSSYPM DYWGQG TTVTVSSASTKGPSVFPLAPCSRSTSESTAALGCLVKDYFPEPVTVSWNSGALTSGVHTF PAVLQSSGLYSLSSVVTVPSSSLGKTKYTCNVDHKPSNTKVDKRVESKYGPCCPPCPAPE FEGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSQEDPEVQFNWYVDGVEVHNAKTKPR EEQFNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKGLPSSIEKTISKAKGQPREPQVYTL PPSQEEMTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTPPVLDSDGSFFLYSRLT VDKSRWQEGNVFSCSVMEALHNHYTQKSLSLGLGK (SEQ ID NO: 82) and a light chain comprising the amino acid sequence of

NIQMTQSPSAMSASVGDRVTITCKASQDIHRYLSWFQQKPGKVPKHLIYRANRLVSGVP SRFSGSGSGTEFTLTISLQPEDFATYYCLQYDEFPYTFGGGTKVEIKRTVAAPSVFIFPPS DEQLKSGTASVVCLLNNFYPREAKVQWKVDNALQSGNSQESVTEQDSKDYSLSSSTL TLSKADYEKHKVYACEVTHQGLSSPVTKSFNRGEC (SEQ ID NO: 83) (*i.e.* Ab_{parental}).

[0070] Solubility

[0071] In various aspects, the antibodies or antigen-binding fragments thereof provided herein have high solubility, a desirable antibody characteristic. Solubility can be measured by any method known in the art for assessing solubility of antibodies, such as any experimental or sequence-based method, for example, polyethylene glycol (PEG) (*e.g.*, PEG6000) precipitation. In some embodiments, solubility is measured with sucrose. In other embodiments, solubility is measured without sucrose.

[0072] In specific embodiments, the antibodies or antigen-binding fragments thereof provided herein are variants of a parental antibody or parental antigen-binding fragment (as the

case may be) and have higher (*e.g.*, about 1.5-fold, 2-fold, 5-fold, 10-fold, 20-fold, 50-fold, 100-fold, 200-fold, 500-fold, or 1000-fold lower, or more) solubility relative to the parental antibody or parental antigen-binding fragment (as the case may be).

[0073] A variant of a parental antibody or parental antigen-binding fragment comprises the amino acid sequence of the parental antibody or parental antigen-binding fragment (as the case may be) with mutations (for example, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, or 20 mutations) introduced into one or more framework regions (FRs) and/or one or more complementarity determining regions (CDRs) while retaining the binding specificity of the parental antibody or parental antigen-binding fragment (as the case may be) to the antigen epitope. In one embodiment, a variant of a parental antibody or parental antigen-binding fragment comprises the amino acid sequence of the parental antibody or parental antigen-binding fragment (as the case may be) with mutations (for example, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, or 20 mutations) introduced into one or more framework regions (FRs) while retaining the binding specificity of the parental antibody or parental antigen-binding fragment (as the case may be) to the antigen epitope. In particular embodiments, the antigen-binding affinity of a variant of a parental antibody or parental antigen-binding fragment (as the case may be) is no less than 50%, 40%, 30%, 20%, or 10% that of the antigen-binding affinities of the antibodies or antigen-binding fragments thereof. In particular embodiments, the antigen-binding affinity of a variant of a parental antibody or parental antigen-binding fragment (as the case may be) is the same as, or is 110% more than, 120% more than, 130% more than, 140% more than, or 150% more than that of the antigen-binding affinities of the antibodies or antigen-binding fragments thereof. Antigen-binding affinity can be measured by any method known in the art for assessing antibody-antigen binding affinities, such as BiacoreTM analysis or a cell binding assay (*i.e.*, a binding assay using cells expressing the antigen on the surface, usually performed using flow cytometry such as fluorescence-activated cell sorting).

[0074] In a specific embodiment, the parental antibody or the parental antigen-binding fragment is an antibody that comprises a heavy chain variable region (VH) comprising the amino acid sequence of
 QMQLVQSGAEVKKTGSSVKVSCASGFNIKDYHLHWVRQAPGQALEWMGWIDPDQG
 DTEYAQKFQDRVTITRDRSMSTAYMELSSLRSEDAMYYCNAAYGSSSYPM DYWGQG
 TTVTVSS (SEQ ID NO: 80) and a light chain variable region (VL) comprising the amino acid

sequence of

NIQMTQSPSAMSASVGDRVITITCKASQDIHRYLSWFQQKPGKVPKHLIYRANRLVSGVPSRFSGSGSGTEFTLTISSLQPEDFATYYCLQYDEFPYTFGGGTKVEIK (SEQ ID NO: 81), or an antigen-binding fragment thereof (as the case may be). In another specific embodiment, the parental antibody or the parental antigen-binding fragment is an antibody that comprises a heavy chain comprising the amino acid sequence of

QMQLVQSGAEVKKTGSSVKVSCASGFNIKDYHLHWVRQAPGQALEWMGWIDPDQG DTEYAQKFQDRVITITRDRSMSTAYMELSSLRSEDAMYYCNAAYGSSSYPM DYWGQG TTVTVSSASTKGPSVFPLAPCSRSTSESTAALGCLVKDYFPEPVTVSWNSGALTSGVHTFPAVLQSSGLYSLSSVVTVPSSSLGTKTYTCNVDHKPSNTKVDKRVESKYGPCCPPCPAPE FEGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSQEDPEVQFNWYVDGVEVHNAKTKPREEQFNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKGLPSSIEKTISKAKGQPREPQVYTLPPSQEEMTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTTPVLDSDGSFFLYSRLTVDKSRWQEGNVFSCSVMHEALHNHYTQKSLSLGLGK (SEQ ID NO: 82) and a light chain comprising the amino acid sequence of

NIQMTQSPSAMSASVGDRVITITCKASQDIHRYLSWFQQKPGKVPKHLIYRANRLVSGVPSRFSGSGSGTEFTLTISSLQPEDFATYYCLQYDEFPYTFGGGTKVEIKRTVAAPSVFIFPPSDEQLKSGTASVVCLLNNFYPREAKVQWKVDNALQSGNSQESVTEQDSKDYSLSSLTLSKADYEEKHKVYACEVTHQGLSSPVTKSFNRGEC (SEQ ID NO: 83) (*i.e.* Ab_{parental}).

[0075] Stability

[0076] In various aspects, the antibodies or antigen-binding fragments provided herein have high stability, a desirable characteristic. Stability can be measured by any method known in the art for assessing stability of antibodies, such as thermostability assay (*e.g.*, differential scanning calorimetry) or thermal shift assay.

[0077] In specific embodiments, the antibodies or antigen-binding fragments thereof provided herein are variants of a parental antibody or parental antigen-binding fragment (as the case may be) and have higher (*e.g.*, about 1.5-fold, 2-fold, 5-fold, 10-fold, 20-fold, 50-fold, 100-fold, 200-fold, 500-fold, or 1000-fold lower, or more) stability relative to the parental antibody or parental antigen-binding fragment (as the case may be). In a specific embodiment when stability is measured by a thermostability assay (*e.g.*, differential scanning calorimetry), the Fab

fragment melting temperature (T_m) of the antibodies or antigen-binding fragments thereof provided herein are higher (*e.g.*, about 2, 3, 4, 5, 5, 7, 8, 9, or 10°C higher, or more) than the Fab fragment T_m of the parental antibody or parental antigen-binding fragment (as the case may be).

[0078] A variant of a parental antibody or parental antigen-binding fragment comprises the amino acid sequence of the parental antibody or parental antigen-binding fragment (as the case may be) with mutations (for example, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, or 20 mutations) introduced into one or more framework regions (FRs) and/or one or more complementarity determining regions (CDRs) while retaining the binding specificity of the parental antibody or parental antigen-binding fragment (as the case may be) to the antigen epitope. In one embodiment, a variant of a parental antibody or parental antigen-binding fragment comprises the amino acid sequence of the parental antibody or parental antigen-binding fragment (as the case may be) with mutations (for example, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, or 20 mutations) introduced into one or more framework regions (FRs) while retaining the binding specificity of the parental antibody or parental antigen-binding fragment (as the case may be) to the antigen epitope. In particular embodiments, the antigen-binding affinity of a variant of a parental antibody or parental antigen-binding fragment (as the case may be) is no less than 50%, 40%, 30%, 20%, or 10% that of the antigen-binding affinities of the antibodies or antigen-binding fragments thereof. In particular embodiments, the antigen-binding affinity of a variant of a parental antibody or parental antigen-binding fragment (as the case may be) is the same as, or is 110% more than, 120% more than, 130% more than, 140% more than, or 150% more than that of the antigen-binding affinities of the antibodies or antigen-binding fragments thereof. Antigen-binding affinity can be measured by any method known in the art for assessing antibody-antigen binding affinities, such as BiacoreTM analysis or a cell binding assay (*i.e.*, a binding assay using cells expressing the antigen on the surface, usually performed using flow cytometry such as fluorescence-activated cell sorting).

[0079] In a specific embodiment, the parental antibody or the parental antigen-binding fragment is an antibody that comprises a heavy chain variable region (VH) comprising the amino acid sequence of
 QMQLVQSGAEVKKTGSSVKVSCASGFNIKDYHLHWVRQAPGQALEWMGWIDPDQG
 DTEYAQKFQDRVTITRDRSMSTAYMELSSLRSEDAMYYCNAAYGSSSPMDYWGQG
 TTVTVSS (SEQ ID NO: 80) and a light chain variable region (VL) comprising the amino acid

sequence of

NIQMTQSPSAMSASVGDRVITITCKASQDIHRYLSWFQQKPGKVPKHLIYRANRLVSGVPSRFSGSGSGTEFTLTISSLQPEDFATYYCLQYDEFPYTFGGGTKVEIK (SEQ ID NO: 81), or an antigen-binding fragment thereof (as the case may be). In another specific embodiment, the parental antibody or the parental antigen-binding fragment is an antibody that comprises a heavy chain comprising the amino acid sequence of

QMQLVQSGAEVKKTGSSVKVSCKASGFNIKDYHLHWVRQAPGQALEWMGWIDPDQG DTEYAQKFQDRVTITRDRSMSTAYMELSSLRSEDAMYYCNAAYGSSSYPM DYWGQG TTVTVSSASTKGPSVFPLAPCSRSTSESTAALGCLVKDYFPEPVTVSWNSGALTSGVHTFPAVLQSSGLYSLSSVVTVPSSSLGTKTYTCNVDHKPSNTKVDKRVESKYGPPCPPCPAPE FEGGPSVFLFPPKPKDTLMISRTPEVTCVVDVDSQEDPEVQFNWYVDGVEVHNAKTKPREEQFNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKGLPSSIEKTISKAKGQPREPQVYTLPPSQEEMTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTPPVLDSDGSFFLYSRLTVDKSRWQEGNVFSCSVMHEALHNHYTQKSLSLGLGK (SEQ ID NO: 82) and a light chain comprising the amino acid sequence of

NIQMTQSPSAMSASVGDRVITITCKASQDIHRYLSWFQQKPGKVPKHLIYRANRLVSGVPSRFSGSGSGTEFTLTISSLQPEDFATYYCLQYDEFPYTFGGGTKVEIKRTVAAPSVFIFPPSDEQLKSGTASVVCLLNNFYPREAKVQWKVDNALQSGNSQESVTEQDSKDSSTYSLSSTLTLSKADYEEKHKVYACEVTHQGLSSPVTKSFNRGEC (SEQ ID NO: 83) (*i.e.* Ab_{parental}).

[0080] Expression

[0081] In various aspects, the antibodies or antigen-binding fragments thereof provided herein have high expression levels, a desirable antibody characteristic. Expression levels can be measured by any method known in the art for assessing expression of antibodies, such as polyacrylamide gel electrophoresis, surface plasmon resonance (SPR), biolayer interferometry, or colorimetric protein assay such as Bradford assay or bicinchoninic acid (BCA) assay, or size-exclusion chromatography (SEC).

[0082] In specific embodiments, the antibodies or antigen-binding fragments thereof provided herein are variants of a parental antibody or parental antigen-binding fragment (as the case may be) and have higher (*e.g.*, about 1.5-fold, 2-fold, 5-fold, 10-fold, 20-fold, 50-fold, 100-

fold, 200-fold, 500-fold, or 1000-fold lower, or more) expression levels relative to the parental antibody or parental antigen-binding fragment (as the case may be).

[0083] A variant of a parental antibody or parental antigen-binding fragment comprises the amino acid sequence of the parental antibody or parental antigen-binding fragment (as the case may be) with mutations (for example, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, or 20 mutations) introduced into one or more framework regions (FRs) and/or one or more complementarity determining regions (CDRs) while retaining the binding specificity of the parental antibody or parental antigen-binding fragment (as the case may be) to the antigen epitope. In one embodiment, a variant of a parental antibody or parental antigen-binding fragment comprises the amino acid sequence of the parental antibody or parental antigen-binding fragment (as the case may be) with mutations (for example, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, or 20 mutations) introduced into one or more framework regions (FRs) while retaining the binding specificity of the parental antibody or parental antigen-binding fragment (as the case may be) to the antigen epitope. In particular embodiments, the antigen-binding affinity of a variant of a parental antibody or parental antigen-binding fragment (as the case may be) is no less than 50%, 40%, 30%, 20%, or 10% that of the antigen-binding affinities of the antibodies or antigen-binding fragments thereof. In particular embodiments, the antigen-binding affinity of a variant of a parental antibody or parental antigen-binding fragment (as the case may be) is the same as, or is 110% more than, 120% more than, 130% more than, 140% more than, or 150% more than that of the antigen-binding affinities of the antibodies or antigen-binding fragments thereof. Antigen-binding affinity can be measured by any method known in the art for assessing antibody-antigen binding affinities, such as Biacore™ analysis or a cell binding assay (*i.e.*, a binding assay using cells expressing the antigen on the surface, usually performed using flow cytometry such as fluorescence-activated cell sorting).

[0084] In a specific embodiment, the parental antibody or the parental antigen-binding fragment is an antibody that comprises a heavy chain variable region (VH) comprising the amino acid sequence of

QMQLVQSGAEVKKTGSSVKVSCASGFNIKDYHLHWVRQAPGQALEWMGWIDPDQG
DTEYAQKFQDRVTITRDRSMSTAYMELSSLRSEDAMYYCNAAYGSSSYPM DYWGQG
TTVTVSS (SEQ ID NO: 80) and a light chain variable region (VL) comprising the amino acid sequence of

NIQMTQSPSAMSASVGDRVITITCKASQDIHRYLSWFQQKPGKVPKHLIYRANRLVSGVP
SRFSGSGSGTEFTLTISLQPEDFATYYCLQYDEFPYTFGGGTKVEIK (SEQ ID NO: 81), or
an antigen-binding fragment thereof (as the case may be). In another specific embodiment, the
parental antibody or the parental antigen-binding fragment is an antibody that comprises a heavy
chain comprising the amino acid sequence of

QMQLVQSGAEVKKTGSSVKVSCASGFNIKDYHLHWVRQAPGQALEWMGWIDPDQG
DTEYAQKFQDRVITITRDRSMSTAYMELSSLRSEDAMYYCNAAYGSSSYPM DYWGQG
TTVTVSSASTKGPSVFPLAPCSRSTSESTAALGCLVKDYFPEPVTVSWNSGALTSGVHTF
PAVLQSSGLYSLSSVVTVPSSSLGTQTYTCNV DHKPSNTKVDKRVESKYGPPCPPCPAPE
FEGGPSVFLFPPKPKDTLMISRTPEVTCVVDVVSQEDPEVQFNWYVDGVEVHNAKTKPR
EEQFNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKGLPSSIEKTISKAKGQPREPQVYTL
PPSQEEMTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTTPVLDSDGSFFLYSRLT
VDKSRWQEGNVFSCSVMHEALHNHYTQKSLSLSLGK (SEQ ID NO: 82) and a light chain
comprising the amino acid sequence of

NIQMTQSPSAMSASVGDRVITITCKASQDIHRYLSWFQQKPGKVPKHLIYRANRLVSGVP
SRFSGSGSGTEFTLTISLQPEDFATYYCLQYDEFPYTFGGGTKVEIKRTVAAPS VFIFPPS
DEQLKSGTASVVCLLNFPREAKVQWKVDNALQSGNSQESVTEQDSK DSTYLSSTL
TLISKADYEKHKVYACEVTHQGLSSPVTKSFNRGEC (SEQ ID NO: 83) (*i.e.* Ab_{parental}).

[0085] In certain embodiments, the antibodies or antigen-binding fragments thereof,
described herein exhibit low or no immunogenicity, and additionally exhibit any two or three of:
high solubility, high stability and high expression levels.

5.1 Antibodies

[0086] As used herein and unless otherwise specified, the terms “about” or “approximately”
mean within plus or minus 10% of a given value or range. In instances where an integer is
required, the terms mean within plus or minus 10% of a given value or range, rounded either up
or down to the nearest integer.

[0087] As used herein, the terms “antibody” and “immunoglobulin” and “Ig” are terms of art
and can be used interchangeably herein and refer to a molecule with an antigen binding site that
specifically binds an antigen.

[0088] Antibodies can include, for example, monoclonal antibodies, recombinantly produced antibodies, monospecific antibodies, multispecific antibodies (including bispecific antibodies), human antibodies, humanized antibodies, such as composite human antibodies or deimmunized antibodies, murine antibodies (*e.g.*, mouse or rat antibodies), chimeric antibodies, synthetic antibodies, and tetrameric antibodies comprising two heavy chain and two light chain molecules. In specific embodiments, antibodies can include, but are not limited to an antibody light chain monomer, an antibody heavy chain monomer, an antibody light chain dimer, an antibody heavy chain dimer, an antibody light chain / antibody heavy chain pair, an antibody with two light chain / heavy chain pairs (*e.g.*, identical pairs), intrabodies, heteroconjugate antibodies, single domain antibodies, monovalent antibodies, bivalent antibodies, single chain antibodies or single-chain Fvs (scFv) (*e.g.*, including monospecific, bispecific, *etc.*), camelized antibodies, and affibodies. In specific embodiments, the antibody is a human antibody, a humanized antibody, a chimeric antibody, a recombinant antibody, a multispecific antibody, or an antigen-binding fragment thereof. In a specific embodiment, the antibody is a monoclonal antibody or antigen-binding fragment thereof. Antigen-binding fragments can include antigen-binding fragments or epitope binding fragments such as, but not limited to, Fv, Fab fragments, F(ab') fragments, F(ab')₂ fragments, scFv, sc(Fv)₂ and disulfide-linked Fvs (dsFv). In certain embodiments, antibodies described herein refer to polyclonal antibody populations. In a specific embodiment, the antibody or antigen-binding fragment thereof as described herein is an antibody.

[0089] Antibodies can be of any type (*e.g.*, IgG, IgE, IgM, IgD, IgA or IgY), any class, (*e.g.*, IgG₁, IgG₂, IgG₃, IgG₄, IgA₁ or IgA₂), or any subclass (*e.g.*, IgG_{2a} or IgG_{2b}) of immunoglobulin molecule. In certain embodiments, antibodies described herein are IgG antibodies (*e.g.*, human IgG), or a class (*e.g.*, human IgG₁, IgG₂, IgG₃, or IgG₄) or subclass thereof. In specific embodiments, the antibody described herein is an IgG₄, such as an IgG₄P or IgG₄PE, isotype antibody.

[0090] In various aspects, the antibody or antigen-binding fragment thereof provided herein comprises a heavy chain constant region.

[0091] In certain embodiments, the heavy chain constant region is a human constant region (*e.g.*, a human IgG constant region). In some embodiments, the heavy chain constant region is a human IgG₁ constant region. In some embodiments, the human IgG₁ constant region is

modified at amino acid Asn297 (Kabat Numbering) to prevent glycosylation of the antibody, for example Asn297Ala (N297A). In some embodiments, the human IgG1 constant region of the antibody is modified at amino acid Leu235 (Kabat Numbering) to alter Fc receptor interactions, for example Leu235Glu (L235E) or Leu235Ala (L235A). In some embodiments, the human IgG1 constant region of the antibody is modified at amino acid Leu234 (Kabat Numbering) to alter Fc receptor interactions, *e.g.*, Leu234Ala (L234A). In some embodiments, the human IgG1 constant region of the antibody is altered at both amino acid 234 and 235, for example Leu234Ala and Leu235Ala (L234A/L235A) (EU index of *Kabat et al 1991 Sequences of Proteins of Immunological Interest*).

[0092] In certain embodiments, the heavy chain constant region is a human IgG2 constant region. In some embodiments, the human IgG2 constant region is modified at amino acid Asn297 (Kabat Numbering) to prevent glycosylation of the antibody, *e.g.*, Asn297Ala (N297A).

[0093] In some embodiments, the heavy chain constant region is a human IgG3 constant region. In some embodiments, the human IgG3 constant region is modified at amino acid Asn297 (Kabat Numbering) to prevent glycosylation of the antibody, *e.g.*, Asn297Ala (N297A). In some embodiments, the human IgG3 constant region is modified at amino acid 435 to extend the half-life, *e.g.*, Arg435His (R435H) (EU index of *Kabat et al 1991 Sequences of Proteins of Immunological Interest*).

[0094] In some embodiments, the heavy chain constant region is a human IgG4 constant region. In some embodiments, the human IgG4 constant region is modified within the hinge region to prevent or reduce strand exchange, *e.g.*, Ser228Pro (S228P). In other embodiments, the human IgG4 constant region is modified at amino acid 235 to alter Fc receptor interactions, *e.g.*, Leu235Glu (L235E). In some embodiments, the human IgG4 constant region is modified within the hinge and at amino acid 235, *e.g.*, Ser228Pro and Leu235Glu (S228P/L235E). In some embodiments, the human IgG4 constant region is modified at amino acid Asn297 (Kabat Numbering) to prevent glycosylation of the antibody, *e.g.*, Asn297Ala (N297A). In some embodiments of the invention, the human IgG4 constant region is modified at amino acid positions Ser228, Leu235, and Asn297 (*e.g.*, S228P/L235E/N297A). (EU index of *Kabat et al 1991 Sequences of Proteins of Immunological Interest*). In other embodiments of the invention, the antibody is of human IgG4 subclass and lacks glycosylation. In these embodiments the

glycosylation can be eliminated by mutation at position 297 (Kabat numbering), for example N297A. In other embodiments, the glycosylation can be eliminated by production of the antibody in a host cell that lacks the ability for post-translational glycosylation, for example a bacterial or yeast derived system or a modified mammalian cell expression system. In a specific embodiment, the heavy chain constant region is a human IgG4 constant region comprising a S228P amino acid substitution according to the EU numbering index. In another specific embodiment, the heavy chain constant region is a human IgG4 constant region comprising a S228P and L235E amino acid substitutions according to the EU numbering index.

[0095] In some embodiments, the human IgG constant region is modified to alter antibody-dependent cellular cytotoxicity (ADCC) and/or complement-dependent cytotoxicity (CDC), *e.g.*, the amino acid modifications described in Natsume *et al.*, 2008 Cancer Res, 68(10): 3863-72; Idusogie *et al.*, 2001 J Immunol, 166(4): 2571-5; Moore *et al.*, 2010 mAbs, 2(2): 181-189; Lazar *et al.*, 2006 PNAS, 103(11): 4005-4010, Shields *et al.*, 2001 JBC, 276(9): 6591-6604; Stavenhagen *et al.*, 2007 Cancer Res, 67(18): 8882-8890; Stavenhagen *et al.*, 2008 Advan. Enzyme Regul., 48: 152-164; Alegre *et al.*, 1992 J Immunol, 148: 3461-3468; Reviewed in Kaneko and Niwa, 2011 Biodrugs, 25(1):1-11.

[0096] In some embodiments, the human IgG constant region is modified to induce heterodimerization. For example, having an amino acid modification within the CH3 domain at Thr366, which when replaced with a more bulky amino acid, *e.g.*, Try (T366W), is able to preferentially pair with a second CH3 domain having amino acid modifications to less bulky amino acids at positions Thr366, Leu368, and Tyr407, *e.g.*, Ser, Ala and Val, respectively (T366S/L368A/Y407V). Heterodimerization via CH3 modifications can be further stabilized by the introduction of a disulfide bond, for example by changing Ser354 to Cys (S354C) and Y349 to Cys (Y349C) on opposite CH3 domains (Reviewed in Carter, 2001 Journal of Immunological Methods, 248: 7-15).

[0097] In various aspects, the antibody or antigen-binding fragment thereof provided herein comprises a light chain constant region selected from the group consisting of a human kappa constant region and a human lambda constant region. In a specific embodiment, the variable portion of the light chain comprises kappa light chain sequences and the constant region of the light chain comprises kappa light chain sequences. In another specific embodiment, the variable

portion of the light chain comprises lambda light chain sequences and the constant region of the light chain comprises lambda light chain sequences. In another specific embodiment, the light chain is a mixed sequence, *e.g.*, the variable portion of the light chain comprises kappa light chain sequences and the constant region of the light chain comprises lambda light chain sequences, or *vice versa*. In certain embodiments, the light chain of an antibody described herein is a human kappa light chain or a human lambda light chain.

[0098] Non-limiting examples of human constant region sequences have been described in the art and are contemplated in this disclosure, *e.g.*, see U.S. Patent No. 5,693,780 and Kabat *et al.* (1991) Sequences of Proteins of Immunological Interest, Fifth Edition, U.S. Department of Health and Human Services, NIH Publication No. 91-3242

[0099] In a particular embodiment, the antibody is a 4-chain antibody unit comprising two heavy (H) chain / light (L) chain pairs, wherein the amino acid sequences of the H chains are identical and the amino acid sequences of the L chains are identical. In a specific embodiment, the H and L chain comprise constant regions, for example, human constant regions. In a yet more specific embodiment, the L chain constant region of such antibodies is a kappa or lambda light chain constant region, for example, a human kappa or lambda light chain constant region. In another specific embodiment, the H chain constant region of such antibodies comprise a gamma heavy chain constant region, for example, a human gamma heavy chain constant region. In a particular embodiment, such antibodies comprise IgG constant regions, for example, human IgG constant regions.

[00100] In certain aspects, the antibody lacks glycosylation, but is not modified at amino acid Asn297 (Kabat numbering). In these embodiments the glycosylation can, for example, be eliminated by production of the antibody in a host cell that lacks a post-translational glycosylation capacity, for example a bacterial or yeast derived system or a modified mammalian cell expression system. In certain aspects, such a system can be a cell-free (CF) expression system.

[00101] In certain embodiments, an antibody or antigen-binding fragment thereof described herein comprises amino acid sequences with certain percent identity relative to the parental antibody or parental antigen-binding fragment (as the case may be).

[00102] The determination of percent identity between two sequences (*e.g.*, amino acid sequences or nucleic acid sequences) can be accomplished using a mathematical algorithm. A non-limiting example of a mathematical algorithm utilized for the comparison of two sequences is the algorithm of Karlin and Altschul, 1990, *Proc. Natl. Acad. Sci. U.S.A.* 87:2264 2268, modified as in Karlin and Altschul, 1993, *Proc. Natl. Acad. Sci. U.S.A.* 90:5873 5877. Such an algorithm is incorporated into the NBLAST and XBLAST programs of Altschul *et al.*, 1990, *J. Mol. Biol.* 215:403. BLAST nucleotide searches can be performed with the NBLAST nucleotide program parameters set, *e.g.*, for score=100, wordlength=12 to obtain nucleotide sequences homologous to a nucleic acid molecules described herein. BLAST protein searches can be performed with the XBLAST program parameters set, *e.g.*, to score 50, wordlength=3 to obtain amino acid sequences homologous to a protein molecule described herein. To obtain gapped alignments for comparison purposes, Gapped BLAST can be utilized as described in Altschul *et al.*, 1997, *Nucleic Acids Res.* 25:3389 3402. Alternatively, PSI BLAST can be used to perform an iterated search which detects distant relationships between molecules (*Id.*). When utilizing BLAST, Gapped BLAST, and PSI Blast programs, the default parameters of the respective programs (*e.g.*, of XBLAST and NBLAST) can be used (see, *e.g.*, National Center for Biotechnology Information (NCBI) on the worldwide web, ncbi.nlm.nih.gov). Another preferred, non limiting example of a mathematical algorithm utilized for the comparison of sequences is the algorithm of Myers and Miller, 1988, *CABIOS* 4:11 17. Such an algorithm is incorporated in the ALIGN program (version 2.0) which is part of the GCG sequence alignment software package. When utilizing the ALIGN program for comparing amino acid sequences, a PAM120 weight residue table, a gap length penalty of 12, and a gap penalty of 4 can be used.

[00103] The percent identity between two sequences can be determined using techniques similar to those described above, with or without allowing gaps. In calculating percent identity, typically only exact matches are counted.

[00104] In certain embodiments, an antibody described herein or an antigen-binding fragment thereof comprises a VH domain having at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, or at least 99% sequence identity to the amino acid sequence of the VH of the parental antibody or parental antigen-binding fragment (as the case may be). In certain embodiments, an antibody described herein or an antigen-binding fragment thereof comprises a VL domain having at least 80%, at least 85%, at least 90%, at least 95%, at least 98%, or at least 99% sequence

identity to the amino acid sequence of the VL of the parental antibody or parental antigen-binding fragment (as the case may be).

[00105] In particular aspects, an antibody or antigen-binding fragment provided herein comprise one or more non-natural amino acid residues at site-specific positions. See, *e.g.*, U.S. Application Publication No. US 2014/0046030 A1, which is incorporated herein by reference in its entirety. In specific aspects, non-natural amino acid residues at site specific positions has advantages for antibody production yield, solubility, binding affinity, and/or activity. Non-limiting examples of non-natural amino acids have been described, see, *e.g.*, U.S. Application Publication No. US 2014/0066598 A1.

[00106] As used herein, the term "non-natural amino acid" refers to an amino acid that is not a proteinogenic amino acid, or a post-translationally modified variant thereof. In particular, the term refers to an amino acid that is not one of the 20 common amino acids or pyrrolysine or selenocysteine, or post-translationally modified variants thereof.

[00107] In a particular aspect, an antibody or antigen-binding fragment provided herein is conjugated to a conjugation moiety or an agent such as a label or toxin. A conjugation moiety can be any conjugation moiety deemed useful to one of skill in the art. For instance, a conjugation moiety can be a polymer, such as polyethylene glycol, that can improve the stability of the antibody *in vitro* or *in vivo*. A conjugation moiety can have therapeutic activity, thereby yielding an antibody-drug conjugate. A conjugation moiety can be a molecular payload that is harmful to target cells. A conjugation moiety can be a label useful for detection or diagnosis. In certain aspects, a conjugation moiety is linked to the antibody via a direct covalent bond. In certain aspects, a conjugation moiety is linked to the antibody via a linker. In particular aspects, a conjugation moiety or a linker is attached via one of the non-natural amino acids of an antibody or antigen-binding fragment thereof described herein. Exemplary conjugation moieties and linkers have been described, *e.g.*, see U.S. Application Publication No. US2014/0046030 A1, which is incorporated herein by reference in its entirety.

[00108] The term "antigen-binding agent" or "binding agent" or "binding protein" refers to an agent (*e.g.*, a protein) comprising a portion (*e.g.*, one or more binding regions such as CDRs) that binds to the antigen, and, optionally, a scaffold or framework portion (*e.g.*, one or more scaffold or framework regions) that allows the binding portion to adopt a conformation that promotes

binding of the antigen-binding agent to an antigen polypeptide, fragment, or epitope. Examples of such antigen-binding agents include antibodies, such as a human antibody, a humanized antibody, a chimeric antibody, a recombinant antibody, a single chain antibody, a diabody, a triabody, a tetrabody, a Fab fragment, a F(ab')₂ fragment, an IgD antibody, an IgE antibody, an IgM antibody, an IgG1 antibody, an IgG2 antibody, an IgG3 antibody, or an IgG4 antibody, and fragments thereof. The antigen-binding agent can comprise, for example, an alternative protein scaffold or artificial scaffold with grafted CDRs or CDR derivatives. Such scaffolds include, but are not limited to, antibody-derived scaffolds comprising mutations introduced to, for example, stabilize the three-dimensional structure of the binding protein as well as wholly synthetic scaffolds comprising, for example, a biocompatible polymer. *See, e.g.,* Korndorfer *et al.*, 2003, *Proteins: Structure, Function, and Bioinformatics* 53(1):121-29; and Roque *et al.*, 2004, *Biotechnol. Prog.* 20:639-54. In addition, peptide antibody mimetics ("PAMs") can be used, as well as scaffolds based on antibody mimetics utilizing fibronectin components as a scaffold.

[00109] As used herein, an "antigen" is a moiety or molecule that contains an epitope to which an antibody can specifically bind. As such, an antigen is also specifically bound by an antibody. In a particular embodiment, the antigen to which an antibody described herein binds, is CD47 (*e.g.*, human CD47), or a fragment thereof.

[00110] As used herein, an "epitope" is a term in the art and refers to a localized region of an antigen to which an antibody can specifically bind. An epitope can be a linear epitope or a conformational, non-linear, or discontinuous, epitope. In the case of a polypeptide antigen, for example, an epitope can be contiguous amino acids of the polypeptide (a "linear" epitope) or an epitope can comprise amino acids from two or more non-contiguous regions of the polypeptide (a "conformational," "non-linear" or "discontinuous" epitope). It will be appreciated by one of skill in the art that, in general, a linear epitope may or may not be dependent on secondary, tertiary, or quaternary structure. For example, in some embodiments, an antibody binds to a group of amino acids regardless of whether they are folded in a natural three dimensional protein structure. In other embodiments, an antibody requires amino acid residues making up the epitope to exhibit a particular conformation (*e.g.*, bend, twist, turn or fold) in order to recognize and bind the epitope.

[00111] As used herein, the terms “immunospecifically binds,” “immunospecifically recognizes,” “specifically binds,” and “specifically recognizes” are analogous terms in the context of antibodies and refer to molecules that bind to an antigen/epitope as such binding is understood by one skilled in the art. For example, a molecule that specifically binds to an antigen may bind to other peptides or polypeptides, generally with lower affinity as determined by, *e.g.*, immunoassays, surface plasmon resonance assays, for example, Biacore™, KinExA platform (Sapidyne Instruments, Boise, ID), or other assays known in the art. In a specific embodiment, molecules that specifically bind to an antigen bind to the antigen with a K_a that is at least 2 logs, 2.5 logs, 3 logs, 4 logs or greater than the K_a when the molecules bind to another antigen. In another specific embodiment, molecules that specifically bind to an antigen do not cross react with other proteins.

[00112] As used herein, the term “monoclonal antibody” is a well known term of art that refers to an antibody obtained from a population of homogenous or substantially homogeneous antibodies. The term “monoclonal” is not limited to any particular method for making the antibody. Generally, a population of monoclonal antibodies can be generated by cells, a population of cells, or a cell line. In specific embodiments, a “monoclonal antibody,” as used herein, is an antibody produced by a single cell or cell line wherein the antibody immunospecifically binds to an antigen epitope (*e.g.*, an epitope of human CD47) as determined, *e.g.*, by ELISA or other antigen-binding or competitive binding assay known in the art or in the Examples provided herein. In particular embodiments, a monoclonal antibody can be a chimeric antibody or a humanized antibody. In particular embodiments, a monoclonal antibody can be a composite human antibody. In particular embodiments, a monoclonal antibody can be a deimmunized antibody. In certain embodiments, a monoclonal antibody is a monovalent antibody or multivalent (*e.g.*, bivalent) antibody. In particular embodiments, a monoclonal antibody is a monospecific or multispecific antibody (*e.g.*, bispecific antibody).

[00113] As used herein, the term “polyclonal antibodies” refers to an antibody population that includes a variety of different antibodies that immunospecifically bind to the same and/or to different epitopes within an antigen or antigens.

[00114] As used herein, the terms “variable region” or “variable domain” refer to a portion of an antibody, generally, a portion of an antibody light or heavy chain, typically corresponding to

about the amino-terminal 110 to 120 amino acids in a mature heavy chain and about the amino-terminal 90 to 100 amino acids in a mature light chain. Variable regions comprise complementarity determining regions (CDRs) flanked by framework regions (FRs). Generally, the spatial orientation of CDRs and FRs are as follows, in an N-terminal to C-terminal direction: FR1-CDR1-FR2-CDR2-FR3-CDR3-FR4. Without wishing to be bound by any particular mechanism or theory, it is believed that the CDRs of the light and heavy chains are primarily responsible for the interaction of the antibody with antigen and for the specificity of the antibody for an epitope. In a specific embodiment, numbering of amino acid positions of antibodies described herein is according to the EU Index, as in Kabat *et al.* (1991) Sequences of Proteins of Immunological Interest, Fifth Edition, U.S. Department of Health and Human Services, NIH Publication No. 91-3242. In certain embodiments, the variable region is a human variable region. In certain embodiments, the variable region comprises murine (*e.g.*, mouse or rat) CDRs and human framework regions (FRs). In particular embodiments, the variable region is a primate (*e.g.*, human or non-human primate) variable region. In certain embodiments, the variable region comprises murine (*e.g.*, mouse or rat) CDRs and primate (*e.g.*, human or non-human primate) framework regions (FRs). As a non-limiting example, a variable region described herein is obtained from assembling two or more fragments of human sequences into a composite human sequence.

[00115] In certain aspects, the CDRs of an antibody can be determined according to (i) the Kabat numbering system (Kabat *et al.* (1971) *Ann. NY Acad. Sci.* 190:382-391 and, Kabat *et al.* (1991) Sequences of Proteins of Immunological Interest, Fifth Edition, U.S. Department of Health and Human Services, NIH Publication No. 91-3242); or (ii) the Chothia numbering scheme, which will be referred to herein as the “Chothia CDRs” (see, *e.g.*, Chothia and Lesk, 1987, *J. Mol. Biol.*, 196:901-917; Al-Lazikani *et al.*, 1997, *J. Mol. Biol.*, 273:927-948; Chothia *et al.*, 1992, *J. Mol. Biol.*, 227:799-817; Tramontano A *et al.*, 1990, *J. Mol. Biol.* 215(1):175-82; and U.S. Patent No. 7,709,226); or (iii) the ImMunoGeneTics (IMGT) numbering system, for example, as described in Lefranc, M.-P., 1999, *The Immunologist*, 7:132-136 and Lefranc, M.-P. *et al.*, 1999, *Nucleic Acids Res.*, 27:209-212 (“IMGT CDRs”); or (iv) MacCallum *et al.*, 1996, *J. Mol. Biol.*, 262:732-745; or (v) the AbM numbering system (see, *e.g.*, Martin *et al.*, 1989, *Proc. Natl Acad. Sci. USA*, 86, 9268–9272; Martin *et al.*, 1991, *Methods Enzymol.*, 203, 121–153; Pedersen *et al.*, 1992, *Immunomethods*, 1-126.; and Rees *et al.*, 1996, In Sternberg M.J.E. (ed.),

Protein Structure Prediction. Oxford University Press, Oxford, 141–172). See also, *e.g.*, Martin, A., “Protein Sequence and Structure Analysis of Antibody Variable Domains,” in *Antibody Engineering*, Kontermann and Dübel, eds., Chapter 31, pp. 422-439, Springer-Verlag, Berlin (2001).

[00116] With respect to the Kabat numbering system, CDRs within an antibody heavy chain molecule are typically present at amino acid positions 31 to 35, which optionally can include one or two additional amino acids, following 35 (referred to in the Kabat numbering scheme as 35A and 35B) (CDR1), amino acid positions 50 to 65 (CDR2), and amino acid positions 95 to 102 (CDR3). Using the Kabat numbering system, CDRs within an antibody light chain molecule are typically present at amino acid positions 24 to 34 (CDR1), amino acid positions 50 to 56 (CDR2), and amino acid positions 89 to 97 (CDR3). As is well known to those of skill in the art, using the Kabat numbering system, the actual linear amino acid sequence of the antibody variable domain can contain fewer or additional amino acids due to a shortening or lengthening of a FR and/or CDR and, as such, an amino acid’s Kabat number is not necessarily the same as its linear amino acid number.

[00117] In certain aspects, the CDRs of an antibody described herein are Chothia CDRs (see, *e.g.*, Chothia and Lesk, 1987, J. Mol. Biol., 196:901-917; and U.S. Patent No. 7,709,226). The term “Chothia CDRs,” and like terms are recognized in the art and refer to antibody CDR sequences as determined according to the method of Chothia and Lesk, 1987, J. Mol. Biol., 196:901-917, which will be referred to herein as the “Chothia CDRs” (see also, *e.g.*, U.S. Patent No. 7,709,226 and Martin, A., “Protein Sequence and Structure Analysis of Antibody Variable Domains,” in *Antibody Engineering*, Kontermann and Dübel, eds., Chapter 31, pp. 422-439, Springer-Verlag, Berlin (2001)). Using the Kabat numbering system of numbering amino acid residues in the VH region and VL region, Chothia CDRs within an antibody heavy chain molecule are typically present at amino acid positions 26 to 32 (CDR1), amino acid positions 53 to 55 (CDR2), and amino acid positions 96 to 101 (CDR3). Using the Kabat numbering system of numbering amino acid residues in the VH region and VL region, Chothia CDRs within an antibody light chain molecule are typically present at amino acid positions 26 to 33 (CDR1), amino acid positions 50 to 52 (CDR2), and amino acid positions 91 to 96 (CDR3). In a specific embodiment, using the Kabat numbering system of numbering amino acid residues in the VH chain region and VL chain region, the Chothia CDRs within an antibody heavy chain molecule

are at amino acid positions 26 to 32 or 34 (CDR1), amino acid positions 52 to 56 (CDR2; in one embodiment, CDR2 is at positions 52A-56, wherein 52A follows position 52), and amino acid positions 95 to 102 (CDR3; in one embodiment, there is no amino acid at one or more positions numbered 96-100); and the Chothia CDRs within an antibody light chain molecule are at amino acid positions 24 to 34 (CDR1), amino acid positions 50 to 56 (CDR2), and amino acid positions 89 to 97 (CDR3). These Chothia CDR positions may vary depending on the antibody, and may be determined according to methods known in the art.

[00118] In certain embodiments, an antibody or antigen-binding fragment thereof described herein comprises CDRs as determined by the IMGT (Immunogenetics) numbering system; see, *e.g.*, Lefranc, M.-P., 1999, *The Immunologist*, 7:132-136 and Lefranc, M.-P. *et al.*, 1999, *Nucleic Acids Res.*, 27:209-212), both of which are incorporated herein by reference in their entirety. Using the IMGT numbering system, CDRs within an antibody heavy chain molecule are typically present at amino acid positions 27 to 38 (CDR1; 5-12 amino acids in length), amino acid positions 56 to 65 (CDR2; 0-10 amino acid positions in length), and amino acid positions 105 to 117 (CDR3; 2-12 amino acids in length). Using Kabat numbering, these heavy chain amino acid positions correspond to amino acid positions 26-35 for CDR1, 51-57 for CDR2 and 93-102 for CDR3. Using the IMGT numbering system, CDRs within an antibody light chain molecule are typically present at amino acid positions 27 to 38 (CDR1; 5-12 amino acids in length), amino acid positions 56 to 65 (CDR2; 0-10 amino acids in length), and amino acid positions 105 to 117 (CDR3; 2-12 amino acids in length). Using Kabat numbering, these light chain amino acid positions correspond to amino acid positions 27-32 for CDR1, 50-52 for CDR2, and 89-97 for CDR3.

[00119] In certain aspects, an antibody or antigen-binding fragment thereof described herein comprises CDRs as determined by the AbM (Oxford Molecular) numbering system (see *e.g.*, Martin *et al.*, 1989, *Proc. Natl Acad. Sci. USA*, 86, 9268-9272; Martin *et al.*, 1991, *Methods Enzymol.*, 203, 121-153; Pedersen *et al.*, 1992, *Immunomethods*, 1-126; and Rees *et al.* 1996, In Sternberg M.J.E. (ed.), *Protein Structure Prediction*. Oxford University Press, Oxford, 141-172). AbM is a hybrid between the Kabat and Chothia definitions and is based on an algorithm designed by the Oxford Molecular Group (ABMTM, a computer program for modeling variable regions of antibodies, Oxford, UK; Oxford Molecular, Ltd.). Using the AbM numbering system, CDRs within an antibody heavy chain molecule are typically present at

amino acid positions 26 to 35 (CDR1; 10-12 amino acids in length), amino acid positions 50 to 58 (CDR2; 9-12 amino acid positions in length), and amino acid positions 95 to 102 (CDR3; 3-25 amino acids in length). Using Kabat numbering, these heavy chain amino acid positions correspond to amino acid positions 26-35 for CDR1, 50-58 for CDR2 and 95-102 for CDR3. The AbM CDRs within an antibody light chain molecule are typically present at amino acid positions 24 to 34 (CDR1), amino acid positions 50 to 56 (CDR2), and amino acid positions 89 to 97 (CDR3). Using Kabat numbering, these light chain amino acid positions correspond to amino acid positions 24-34 for CDR1, 50-56 for CDR2, and 89-97 for CDR3. These AbM CDR positions may vary depending on the antibody, and may be determined according to methods known in the art.

[00120] Framework regions described herein are determined based upon the boundaries of the CDR numbering system. In other words, if the CDRs are determined by, *e.g.*, Kabat, IMGT, Chothia, or ABM, then the framework regions are the amino acid residues surrounding the CDRs in the variable region in the format, from the N-terminus to C-terminus: FR1-CDR1-FR2-CDR2-FR3-CDR3-FR4. For example, FR1 is defined as the amino acid residues N-terminal to the CDR1 amino acid residues as defined by, *e.g.*, the Kabat numbering system, the IMGT numbering system, the Chothia numbering system, or the ABM numbering system, FR2 is defined as the amino acid residues between CDR1 and CDR2 amino acid residues as defined by, *e.g.*, the Kabat numbering system, the IMGT numbering system, the Chothia numbering system, or the ABM numbering system, FR3 is defined as the amino acid residues between CDR2 and CDR3 amino acid residues as defined by, *e.g.*, the Kabat numbering system, the IMGT numbering system, the Chothia numbering system, or the ABM numbering system, and FR4 is defined as the amino acid residues C-terminal to the CDR3 amino acid residues as defined by, *e.g.*, the Kabat numbering system, the IMGT numbering system, the Chothia numbering system, or the ABM numbering system.

[00121] In specific embodiments, an antibody or antigen-binding fragment described herein specifically binds to Cluster of Differentiation 47 (CD47) (*e.g.*, human CD47). As used herein, the terms “Cluster of Differentiation 47” or “CD47” or “integrin-associated protein” or “IAP” or “ovarian cancer antigen” or “OA3” or “Rh-related antigen” or “MER6” can be used interchangeably and refer to a multi-spanning transmembrane receptor belonging to the immunoglobulin superfamily. The amino acid sequence of an exemplary human CD47 is

provided below (GenBank Accession No. Q08722.1 (GI:1171879), incorporated herein by reference). The signal sequence (amino acids 1-18) is underlined.

```

1  MWPLVAALLL GSACCGSAQL LFNKTKSVEF TFCNDTVVIP CFVTNMEAQN TTEVYVKWKF
61  KGRDIYTFDG ALNKSTVPTD FSSAKIEVSQ LLKGDASLKM DKSDAVSHTG NYTCEVTELT
121 REGETIIEELK YRVVSWFSPN ENILIVIFPI FAILLFWGQF GIKTLKYRSG GMDEKTIALL
181 VAGLVITVIV IVGAILFVPG EYSLKNATGL GLIVTSTGIL ILLHYVVFST AIGLTSFVIA
241 ILVIQVIAYI LAVVGLSLCI AACIPMHGPL LISGLSILAL AQLLGLVYMK FVASNQKTIQ
301 PPRKAVEEPL NAFKESKGMM NDE (SEQ ID NO: 84)

```

[00122] For clarity, the amino acid sequence of an exemplary human CD47 excluding the signal sequence is provided below.

```

1  QLLFNKTKSV EFTFCNDTVV IPCFVTNMEA QNTTEVYVKW KFKGRDIYTF DGALNKSTVP
61  TDFSSAKIEV SQLLKGDASL KMDKSDAVSH TGNYTCEVTE LTREGETIIE LKYRVVSWFS
121 PNENILIVIF PIFAILLFWG QFGIKTLKYR SSGMDEKTIA LLVAGLVITV IVIVGAILFV
181 PGEYSLKNAT GLGLIVTSTG ILILLHYVVF STAIGLTSFV IAILVIQVIA YILAVVGLSL
241 CIAACIPMHG PLLISGLSIL ALAQLLGLVY MKFVASNQKT IQPPRKAVEE PLNAFKESKG
201 MMNDE (SEQ ID NO: 85)

```

[00123] In specific embodiments, anti-CD47 antibodies or antigen-binding fragments thereof described herein promote (*e.g.*, induce or increase) phagocytosis of cells, *e.g.*, CD47-expressing cells (*e.g.*, CCRF-CEM cells), for example, by macrophages. In one aspect, the level of phagocytosis in the presence of anti-CD47 antibodies or antigen-binding fragments thereof described herein is increased by at least 5%, at least 10%, at least 20%, at least 30%, at least 40%, at least 50%, at least 60%, at least 70%, at least 80%, at least 90%, at least 99%, at least 150%, at least 200%, compared to the level of phagocytosis in the presence of anti-CD47 antibodies described herein.

[00124] In specific aspects, anti-CD47 antibodies or antigen-binding fragments thereof described herein do not promote (*e.g.*, induce or increase), or cause a significant level of, agglutination of cells, *e.g.*, anti-CD47 antibodies or antigen-binding fragments thereof described herein do not promote (*e.g.*, induce or increase), or cause a significant level of, hemagglutination of red blood cells. In one aspect, the level of agglutination in the presence of anti-CD47

antibodies or antigen-binding fragments thereof described herein is reduced by at least 5%, at least 10%, at least 20%, at least 30%, at least 40%, at least 50%, at least 60%, at least 70%, at least 80%, at least 90%, or at least 99% compared to the level of agglutination in the presence of anti-CD47 antibodies or antigen-binding fragments thereof known to induce agglutination, such as MCA911 mouse anti-human CD47 antibody (BRIC126). In some aspects, anti-CD47 antibodies or antigen-binding fragments thereof described herein do not promote (*e.g.*, induce or increase), or cause a significant level of, agglutination if the level of agglutination in the presence of anti-CD47 antibodies or antigen-binding fragments thereof described herein is reduced by at least 5%, at least 10%, at least 20%, at least 30%, at least 40%, at least 50%, at least 60%, at least 70%, at least 80%, at least 90%, or at least 99% compared to the level of agglutination in the presence of existing anti-CD47 antibodies or antigen-binding fragments thereof known to induce agglutination, such as MCA911 mouse anti-human CD47 antibody (BRIC126).

[00125] Anti-CD47 antibodies or antigen-binding fragments thereof described herein also include monoclonal antibodies that specifically bind CD47, wherein the antibodies or antigen-binding fragments thereof do not promote (*e.g.*, induce or increase), or cause a significant level of, agglutination, *e.g.*, red blood cell hemagglutination (“RBC hemagglutination”).

[00126] In some aspects, the level of RBC depletion is determined by measuring the RBC count in a subject after administration of a treatment, *e.g.*, an anti-CD47 antibody or an antigen-binding fragment thereof described herein. In some embodiments, anti-CD47 antibodies or antigen-binding fragments thereof described herein do not promote (*e.g.*, induce or increase), or cause a significant level of, RBC depletion if the RBC count in a subject after administration of an anti-CD47 antibody or an antigen-binding fragment thereof described herein is within the range of a normal, healthy subject. For example, the RBC count for a normal, healthy male human is about 4.7 to about 6.1 million cells per microliter of blood sample. For example, the RBC count for a normal, healthy female human is 4.2 to about 5.4 million cells per microliter of blood sample. In some aspects, anti-CD47 antibodies or antigen-binding fragments thereof described herein do not promote (*e.g.*, induce or increase), or cause a significant level of, RBC depletion if the RBC count in a subject after administration (*e.g.*, 5 min, 10 min, 30 min, 1 h, 2 h, 3 h, 4 h, 5 h, 12 h, 24 h, 2 days, 4 days, 6 days, 1 week, 2 weeks, 3 weeks, 1 month, 2 months, or more) of an anti-CD47 antibody or an antigen-binding fragment thereof described herein is at

least 50%, 60%, 70%, 80%, 90%, 95%, 97%, 98%, 99%, or 99.5% of the RBC count prior to administration. In specific aspects, anti-CD47 antibodies or antigen-binding fragments thereof described herein do not promote (*e.g.*, induce or increase), or cause a significant level of, RBC depletion if the RBC count in a subject after administration (5 min, 10 min, 30 min, 1 h, 2 h, 3 h, 4 h, 5 h, 12 h, 24 h, 2 days, 4 days, 6 days, 1 week, 2 weeks, 3 weeks, 1 month, 2 months, or more) of an anti47 antibody or an antigen-binding fragment thereof described herein is at least 50%, 60%, 70%, 80%, 90%, 95%, 97%, 98%, 99%, or 99.5% of the RBC count in a subject after administration of a placebo treatment (*e.g.*, vehicle). RBC counts are determined by standard methods in the art.

[00127] In specific aspects, anti-CD47 antibodies or antigen-binding fragments thereof described herein do not promote (*e.g.*, induce or increase), or cause a significant level of, platelet depletion. For example, administration of an anti-CD47 antibody or an antigen-binding fragment thereof described herein leads to a percentage of platelets remaining of at least 30%, 40%, 50%, 60%, 70%, 80%, 90%, or 100%.

[00128] Also, anti-CD47 antibodies or antigen-binding fragments thereof described herien include but are not limited to antibodies that do not bind to, or have a low binding affinity to, a Fcγ receptor (FcγR). For example, the constant region of an anti-CD47 antibody or an antigen-binding fragment thereof, *e.g.*, when produced using a CF expression system, has a lower binding affinity to a FcγR than the constant region of an anti-CD47 antibody or an antigen-binding fragment thereof, *e.g.*, when produced using a host cell (*e.g.*, CHO cells) expression system.

[00129] Those skilled in the art will recognize that it is possible to quantitate, without undue experimentation, the level of agglutination, *e.g.*, the level of hemagglutination of RBCs. For example, those skilled in the art will recognize that the level of hemagglutination is ascertained by measuring the area of an RBC dot after performing a hemagglutination assay in the presence of anti-CD47 antibodies or antigen-binding fragments thereof described. In some cases, the area of the RBC dot in the presence of an anti-CD47 antibody or an antigen-binding fragment thereof described herien is compared to the area of the RBC dot in the absence of the anti-CD47 antibody or antigen-binding fragment thereof, *e.g.*, in the presence of zero hemagglutination. In this manner, hemagglutination is quantified relative to a baseline control. A larger RBC dot area

corresponds to a higher level of hemagglutination. Alternatively, densitometry of the RBC dot may also be utilized to quantitate hemagglutination.

[00130] Those skilled in the art will recognize that it is possible to quantitate, without undue experimentation, the level of RBC depletion. For example, those skilled in the art will recognize that the level of RBC depletion is ascertained, *e.g.*, by measuring the RBC count (*i.e.*, the total number of RBCs in a sample of blood), *e.g.*, by using a cell counter or a hemacytometer. Those of skill in the art will recognize that the RBCs in a sample of blood can optionally be isolated by fractionating whole blood using, *e.g.*, centrifugation, prior to counting. In some cases, the RBC count in the presence of an anti-CD47 antibody or an antigen-binding fragment thereof described herein is compared to the RBC count in the absence of the CD47 antibody or antigen-binding fragment thereof, *e.g.*, in the presence of zero RBC depletion. In this manner, the level of RBC depletion is normalized relative to a baseline control.

[00131] In specific aspects, anti-CD47 antibodies or antigen-binding fragments thereof provided herein exhibit inhibitory activity, for example by inhibiting CD47 expression (*e.g.*, inhibiting cell surface expression of CD47), activity, and/or signaling, or by interfering with the interaction between CD47 and SIRP α . In certain aspects, anti-CD47 antibodies or antigen-binding fragments thereof provided herein completely or partially reduce or otherwise modulate CD47 expression or activity upon binding to, or otherwise interacting with, CD47, *e.g.*, a human CD47. The reduction or modulation of a biological function of CD47 is complete, significant, or partial upon interaction between the antibodies and the human CD47 polypeptide and/or peptide. Anti-CD47 antibodies or antigen-binding fragments thereof described herein are considered to completely inhibit CD47 expression or activity when the level of CD47 expression or activity in the presence of the antibody is decreased by at least 95%, *e.g.*, by 96%, 97%, 98%, 99% or 100% as compared to the level of CD47 expression or activity in the absence of interaction, *e.g.*, binding, with the antibody described herein. In a particular aspect, anti-CD47 antibodies or antigen-binding fragments thereof are considered to significantly inhibit CD47 expression or activity when the level of CD47 expression or activity in the presence of the CD47 antibody or antigen-binding fragment thereof is decreased by at least 50%, *e.g.*, 55%, 60%, 75%, 80%, 85% or 90% as compared to the level of CD47 expression or activity in the absence of binding with a CD47 antibody or antigen-binding fragment thereof described herein. In certain aspects, anti-CD47 antibodies or antigen-binding fragments thereof are considered to partially inhibit CD47

expression or activity when the level of CD47 expression or activity in the presence of the antibody is decreased by less than 95%, *e.g.*, 10%, 20%, 25%, 30%, 40%, 50%, 60%, 75%, 80%, 85% or 90% as compared to the level of CD47 expression or activity in the absence of interaction, *e.g.*, binding, with an antibody or antigen-binding fragment thereof described herein.

[00132] In specific aspects, such anti-CD47 antibody or antigen-binding fragments thereof blocks CD47 binding to SIRP α , promotes phagocytosis, has reduced or no Fc effector function (*e.g.*, binding to Fc γ R, ADCC, or CDC) and/or has little or no agglutination (*e.g.*, hemagglutination) activity.

[00133] In some embodiments, the anti-CD47 antibody or antigen-binding fragment thereof when produced using a cell-free (CF) expression system has a higher antibody expression titer or yield compared to the parental antibody when expressed in the CF system. In a particular aspect, anti-CD47 antibodies or antigen-binding fragments thereof provided herein which are expressed in a CF system, are aglycosylated.

[00134] The terms red blood cell(s) and erythrocyte(s) are synonymous and used interchangeably herein.

[00135] The term agglutination refers to cellular clumping, while the term hemagglutination refers to clumping of a specific subset of cells, *i.e.*, red blood cells. Thus, hemagglutination is a type of agglutination.

5.1.1 Antibodies with specific heavy chain variable region framework region sequences

[00136] Provided herein are antibodies and antigen-binding fragments thereof comprising specific heavy chain variable region framework region (VH FR) sequences.

[00137] In one aspect, provided herein is an antibody or an antigen-binding fragment thereof, comprising a heavy chain variable region (VH) that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1, VH FR2, VH FR3 and VH FR4 comprise the amino acid sequence of $X_{H1}X_{H2}X_{H3}QLVQSGX_{H4}EVKKX_{H5}GX_{H6}X_{H7}VKX_{H8}SCKX_{H9}S$ (SEQ ID NO: 1);

WVX_{H10}QAX_{H11}GX_{H12}X_{H13}LEWX_{H14}G (SEQ ID NO: 2);

YAX_{H15}KX_{H16}QX_{H17}RVTX_{H18}TX_{H19}X_{H20}X_{H21}SX_{H22}X_{H23}TX_{H24}YMELX_{H25}X_{H26}LRAX_{H27}DTA
X_{H28}YYC (SEQ ID NO: 3); and

WGX_{H29}GTX_{H30}VTVSS (SEQ ID NO: 4), respectively,

wherein X_{H1} is M or no amino acid, X_{H2} is Q or E, X_{H3} is V or M, X_{H4} is A or P, X_{H5} is P or T, X_{H6} is A, S, or T, X_{H7} is S or T, X_{H8} is V or I, X_{H9} is A or V, X_{H10} is R or Q, X_{H11} is P, R, or T, X_{H12} is Q or K, X_{H13} is G, R, or A, X_{H14} is M or I, X_{H15} is Q or E, X_{H16} is F or L, X_{H17} is G, D, or E, X_{H18} is M or I, X_{H19} is R, T, E or A, X_{H20} is D or N, X_{H21} is T, R, M, E, or K, X_{H22} is I, A T, or M, X_{H23} is S or D, X_{H24} is A or V, X_{H25} is S or R, X_{H26} is S or R, X_{H27} is D or E, X_{H28} is V or M, X_{H29} is Q or R, and X_{H30} is L, M or T.

[00138] In certain embodiments of the preceding aspect, at least one of the following is satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H12} is K, X_{H13} is G, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, X_{H28} is V, and X_{H30} is L. In certain embodiments, at least two of the following are satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H12} is K, X_{H13} is G, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, X_{H28} is V, and X_{H30} is L. In certain embodiments, at least three of the following are satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H12} is K, X_{H13} is G, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, X_{H28} is V, and X_{H30} is L. In certain embodiments, at least four of the following are satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H12} is K, X_{H13} is G, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, X_{H28} is V, and X_{H30} is L. In certain embodiments, at least five of the following are satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H12} is K, X_{H13} is G, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, X_{H28} is V, and X_{H30} is L. In certain embodiments, at least six of the following are satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H12} is K, X_{H13} is G, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, X_{H28} is V, and X_{H30} is L. In certain embodiments, at least seven of the following are satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H12} is K, X_{H13} is G, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, X_{H28} is V, and X_{H30} is L. In certain embodiments, at least eight of the following are satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H12} is K, X_{H13} is G, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, X_{H28} is V, and X_{H30} is L. In certain embodiments, at least nine of the following are satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H12} is K,

X_{H13} is G, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, X_{H28} is V, and X_{H30} is L. In certain embodiments, at least ten of the following are satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H12} is K, X_{H13} is G, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, X_{H28} is V, and X_{H30} is L. In certain embodiments, at least eleven of the following are satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H12} is K, X_{H13} is G, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, X_{H28} is V, and X_{H30} is L. In certain embodiments, at least twelve of the following are satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H12} is K, X_{H13} is G, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, X_{H28} is V, and X_{H30} is L. In certain embodiments, at least thirteen of the following are satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H12} is K, X_{H13} is G, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, X_{H28} is V, and X_{H30} is L. In certain embodiments, at least fourteen of the following are satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H12} is K, X_{H13} is G, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, X_{H28} is V, and X_{H30} is L. In certain embodiments, X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H12} is K, X_{H13} is G, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, X_{H28} is V, and X_{H30} is L.

[00139] In certain embodiments of the preceding aspect, at least one of the following is satisfied: X_{H5} is P, X_{H12} is K, X_{H13} is G, X_{H17} is G, X_{H22} is T, X_{H25} is R, X_{H28} is V, and X_{H30} is L. In certain embodiments, at least two of the following are satisfied: X_{H5} is P, X_{H12} is K, X_{H13} is G, X_{H17} is G, X_{H22} is T, X_{H25} is R, X_{H28} is V, and X_{H30} is L. In certain embodiments, at least three of the following are satisfied: X_{H5} is P, X_{H12} is K, X_{H13} is G, X_{H17} is G, X_{H22} is T, X_{H25} is R, X_{H28} is V, and X_{H30} is L. In certain embodiments, at least four of the following are satisfied: X_{H5} is P, X_{H12} is K, X_{H13} is G, X_{H17} is G, X_{H22} is T, X_{H25} is R, X_{H28} is V, and X_{H30} is L. In certain embodiments, at least five of the following are satisfied: X_{H5} is P, X_{H12} is K, X_{H13} is G, X_{H17} is G, X_{H22} is T, X_{H25} is R, X_{H28} is V, and X_{H30} is L. In certain embodiments, at least six of the following are satisfied: X_{H5} is P, X_{H12} is K, X_{H13} is G, X_{H17} is G, X_{H22} is T, X_{H25} is R, X_{H28} is V, and X_{H30} is L. In certain embodiments, at least seven of the following are satisfied: X_{H5} is P, X_{H12} is K, X_{H13} is G, X_{H17} is G, X_{H22} is T, X_{H25} is R, X_{H28} is V, and X_{H30} is L. In certain embodiments, X_{H5} is P, X_{H12} is K, X_{H13} is G, X_{H17} is G, X_{H22} is T, X_{H25} is R, X_{H28} is V, and X_{H30} is L.

[00140] In certain embodiments of the preceding aspect, at least one of the following is satisfied: X_{H12} is K, X_{H13} is G, and X_{H30} is L. In certain embodiments, at least two of the following are satisfied: X_{H12} is K, X_{H13} is G, and X_{H30} is L. In certain embodiments, X_{H12} is K, X_{H13} is G, and X_{H30} is L.

[00141] In a specific embodiment of the certain embodiments wherein at least one, two, or all of the following are satisfied: X_{H12} is K, X_{H13} is G, and X_{H30} is L, at least one of the following is further satisfied: X_{H5} is P, X_{H17} is G, X_{H22} is T, X_{H25} is R, and X_{H28} is V. In another specific embodiment of the certain embodiments wherein at least one, two, or all of the following are satisfied: X_{H12} is K, X_{H13} is G, and X_{H30} is L, at least two of the following are further satisfied: X_{H5} is P, X_{H17} is G, X_{H22} is T, X_{H25} is R, and X_{H28} is V. In another specific embodiment of the certain embodiments wherein at least one, two, or all of the following are satisfied: X_{H12} is K, X_{H13} is G, and X_{H30} is L, at least three of the following are further satisfied: X_{H5} is P, X_{H17} is G, X_{H22} is T, X_{H25} is R, and X_{H28} is V. In another specific embodiment of the certain embodiments wherein at least one, two, or all of the following are satisfied: X_{H12} is K, X_{H13} is G, and X_{H30} is L, at least four of the following are further satisfied: X_{H5} is P, X_{H17} is G, X_{H22} is T, X_{H25} is R, and X_{H28} is V. In another specific embodiment of the certain embodiments wherein at least one, two, or all of the following are satisfied: X_{H12} is K, X_{H13} is G, and X_{H30} is L, the following is further satisfied: X_{H5} is P, X_{H17} is G, X_{H22} is T, X_{H25} is R, and X_{H28} is V.

[00142] In a further specific embodiment wherein at least one, two, or all of the following are satisfied: X_{H12} is K, X_{H13} is G, and X_{H30} is L, and wherein at least one, two, three, four, or all of the following are satisfied: X_{H5} is P, X_{H17} is G, X_{H22} is T, X_{H25} is R, and X_{H28} is V, at least one of the following is further satisfied: X_{H3} is V, X_{H6} is A, X_{H16} is L, X_{H18} is M, X_{H19} is T, X_{H21} is T, and X_{H27} is D. In another further specific embodiment wherein at least one, two, or all of the following are satisfied: X_{H12} is K, X_{H13} is G, and X_{H30} is L, and wherein at least one, two, three, four, or all of the following are satisfied: X_{H5} is P, X_{H17} is G, X_{H22} is T, X_{H25} is R, and X_{H28} is V, at least two of the following are further satisfied: X_{H3} is V, X_{H6} is A, X_{H16} is L, X_{H18} is M, X_{H19} is T, X_{H21} is T, and X_{H27} is D. In another further specific embodiment wherein at least one, two, or all of the following are satisfied: X_{H12} is K, X_{H13} is G, and X_{H30} is L, and wherein at least one, two, three, four, or all of the following are satisfied: X_{H5} is P, X_{H17} is G, X_{H22} is T, X_{H25} is R, and X_{H28} is V, at least three of the following are further satisfied: X_{H3} is V, X_{H6} is A, X_{H16} is L, X_{H18} is M, X_{H19} is T, X_{H21} is T, and X_{H27} is D. In another further specific embodiment wherein at

least one, two, or all of the following are satisfied: X_{H12} is K, X_{H13} is G, and X_{H30} is L, and wherein at least one, two, three, four, or all of the following are satisfied: X_{H5} is P, X_{H17} is G, X_{H22} is T, X_{H25} is R, and X_{H28} is V, at least four of the following are further satisfied: X_{H3} is V, X_{H6} is A, X_{H16} is L, X_{H18} is M, X_{H19} is T, X_{H21} is T, and X_{H27} is D. In another further specific embodiment wherein at least one, two, or all of the following are satisfied: X_{H12} is K, X_{H13} is G, and X_{H30} is L, and wherein at least one, two, three, four, or all of the following are satisfied: X_{H5} is P, X_{H17} is G, X_{H22} is T, X_{H25} is R, and X_{H28} is V, at least five of the following are further satisfied: X_{H3} is V, X_{H6} is A, X_{H16} is L, X_{H18} is M, X_{H19} is T, X_{H21} is T, and X_{H27} is D. In another further specific embodiment wherein at least one, two, or all of the following are satisfied: X_{H12} is K, X_{H13} is G, and X_{H30} is L, and wherein at least one, two, three, four, or all of the following are satisfied: X_{H5} is P, X_{H17} is G, X_{H22} is T, X_{H25} is R, and X_{H28} is V, at least six of the following are further satisfied: X_{H3} is V, X_{H6} is A, X_{H16} is L, X_{H18} is M, X_{H19} is T, X_{H21} is T, and X_{H27} is D. In another further specific embodiment wherein at least one, two, or all of the following are satisfied: X_{H12} is K, X_{H13} is G, and X_{H30} is L, and wherein at least one, two, three, four, or all of the following are satisfied: X_{H5} is P, X_{H17} is G, X_{H22} is T, X_{H25} is R, and X_{H28} is V, the following is further satisfied: X_{H3} is V, X_{H6} is A, X_{H16} is L, X_{H18} is M, X_{H19} is T, X_{H21} is T, and X_{H27} is D.

[00143] In a specific embodiment of the certain embodiments wherein at least one, two, or all of the following are satisfied: X_{H12} is K, X_{H13} is G, and X_{H30} is L, at least one of the following is further satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V. In another specific embodiment wherein at least one, two, or all of the following are satisfied: X_{H12} is K, X_{H13} is G, and X_{H30} is L, at least two of the following are further satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V. In another specific embodiment wherein at least one, two, or all of the following are satisfied: X_{H12} is K, X_{H13} is G, and X_{H30} is L, at least three of the following are further satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V. In another specific embodiment wherein at least one, two, or all of the following are satisfied: X_{H12} is K, X_{H13} is G, and X_{H30} is L, at least four of the following are further satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V. In another specific embodiment wherein at least one, two, or all of the

following are satisfied: X_{H12} is K, X_{H13} is G, and X_{H30} is L, at least five of the following are further satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V. In another specific embodiment wherein at least one, two, or all of the following are satisfied: X_{H12} is K, X_{H13} is G, and X_{H30} is L, at least six of the following are further satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V. In another specific embodiment wherein at least one, two, or all of the following are satisfied: X_{H12} is K, X_{H13} is G, and X_{H30} is L, at least seven of the following are further satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V. In another specific embodiment wherein at least one, two, or all of the following are satisfied: X_{H12} is K, X_{H13} is G, and X_{H30} is L, at least eight of the following are further satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V. In another specific embodiment wherein at least one, two, or all of the following are satisfied: X_{H12} is K, X_{H13} is G, and X_{H30} is L, at least nine of the following are further satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V. In another specific embodiment wherein at least one, two, or all of the following are satisfied: X_{H12} is K, X_{H13} is G, and X_{H30} is L, at least ten of the following are further satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V. In another specific embodiment wherein at least one, two, or all of the following are satisfied: X_{H12} is K, X_{H13} is G, and X_{H30} is L, at least eleven of the following are further satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V. In another specific embodiment wherein at least one, two, or all of the following are satisfied: X_{H12} is K, X_{H13} is G, and X_{H30} is L, the following is further satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V.

[00144] In specific embodiments of the preceding aspect, X_{H3} is M, X_{H6} is S, X_{H16} is F, X_{H18} is I, X_{H19} is R, X_{H21} is R, and X_{H27} is E.

[00145] In another aspect, provided herein is an antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal

order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1, VH FR2, VH FR3 and VH FR4 comprise the amino acid sequence of

$X_{H1}QX_{H3}QLVQSGAEVKKX_{H5}GX_{H6}SVKVSCKAS$ (SEQ ID NO: 5),

$WVRQAPGX_{H12}X_{H13}LEWMG$ (SEQ ID NO: 6),

$YAQKX_{H16}QX_{H17}RVTX_{H18}TX_{H19}DX_{H21}SX_{H22}STAYMELX_{H25}SLRX_{H31}X_{H27}DTAX_{H28}YYC$ (SEQ ID NO: 7), and

$WGX_{H29}GTX_{H30}VTVSS$ (SEQ ID NO: 4) respectively,

wherein X_{H1} is M or no amino acid, X_{H3} is V or M, X_{H5} is P or T, X_{H6} is A, S, or T, X_{H12} is Q or K, X_{H13} is G, R, or A, X_{H16} is F or L, X_{H17} is G, D, or E, X_{H18} is M or I, X_{H19} is R, T, E or A, X_{H21} is T, R, M, E, or K, X_{H22} is I, A T, or M, X_{H25} is S or R, X_{H31} is S or A, X_{H27} is D or E, and X_{H28} is V or M, X_{H29} is Q or R, and X_{H30} is L, M or T, and

wherein at least one of the following is satisfied: X_{H12} is K, X_{H13} is G, X_{H31} is A, and X_{H30} is L.

In certain embodiments, at least two of the following are satisfied: X_{H12} is K, X_{H13} is G, X_{H31} is A, and X_{H30} is L.

In certain embodiments, at least three of the following are satisfied: X_{H12} is K, X_{H13} is G, X_{H31} is A, and X_{H30} is L. In certain embodiments, X_{H12} is K, X_{H13} is G, X_{H31} is A, and X_{H30} is L.

[00146] In a specific embodiment of the preceding aspect and certain embodiments wherein at least one, two, three, or all of the following is satisfied: X_{H12} is K, X_{H13} is G, X_{H31} is A, and X_{H30} is L, at least one of the following is further satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V. In another specific embodiment of the preceding aspect and certain embodiments wherein at least one, two, three, or all of the following is satisfied: X_{H12} is K, X_{H13} is G, X_{H31} is A, and X_{H30} is L, at least two of the following are further satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V. In another specific embodiment of the preceding aspect and certain embodiments wherein at least one, two, three, or all of the following is satisfied: X_{H12} is K, X_{H13} is G, X_{H31} is A, and X_{H30} is L, at least three of the following are further satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V. In another specific embodiment of the preceding aspect and certain embodiments wherein at least one, two, three, or all of the following is satisfied: X_{H12} is K, X_{H13} is G, X_{H31} is A, and X_{H30} is L, at least four of the following are further satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G,

X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V. In another specific embodiment of the preceding aspect and certain embodiments wherein at least one, two, three, or all of the following is satisfied: X_{H12} is K, X_{H13} is G, X_{H31} is A, and X_{H30} is L, at least five of the following are further satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V. In another specific embodiment of the preceding aspect and certain embodiments wherein at least one, two, three, or all of the following is satisfied: X_{H12} is K, X_{H13} is G, X_{H31} is A, and X_{H30} is L, at least six of the following are further satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V. In another specific embodiment of the preceding aspect and certain embodiments wherein at least one, two, three, or all of the following is satisfied: X_{H12} is K, X_{H13} is G, X_{H31} is A, and X_{H30} is L, at least seven of the following are further satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V. In another specific embodiment of the preceding aspect and certain embodiments wherein at least one, two, three, or all of the following is satisfied: X_{H12} is K, X_{H13} is G, X_{H31} is A, and X_{H30} is L, at least eight of the following are further satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V. In another specific embodiment of the preceding aspect and certain embodiments wherein at least one, two, three, or all of the following is satisfied: X_{H12} is K, X_{H13} is G, X_{H31} is A, and X_{H30} is L, at least nine of the following are further satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V. In another specific embodiment of the preceding aspect and certain embodiments wherein at least one, two, three, or all of the following is satisfied: X_{H12} is K, X_{H13} is G, X_{H31} is A, and X_{H30} is L, at least ten of the following are further satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V. In another specific embodiment of the preceding aspect and certain embodiments wherein at least one, two, three, or all of the following is satisfied: X_{H12} is K, X_{H13} is G, X_{H31} is A, and X_{H30} is L, at least eleven of the following are further satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V. In another specific embodiment of the preceding aspect and certain embodiments wherein at least one, two, three, or all of the following is satisfied: X_{H12} is K, X_{H13} is G, X_{H31} is A, and X_{H30} is L, the following is

further satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V.

[00147] In a specific embodiment of the preceding aspect and certain embodiments wherein at least one, two, three, or all of the following are satisfied: X_{H12} is K, X_{H13} is G, X_{H31} is A, and X_{H30} is L, at least one of the following is further satisfied: X_{H5} is P, X_{H17} is G, X_{H22} is T, X_{H25} is R, and X_{H28} is V. In another specific embodiment of the preceding aspect and certain embodiments wherein at least one, two, three, or all of the following are satisfied: X_{H12} is K, X_{H13} is G, X_{H31} is A, and X_{H30} is L, at least two of the following are further satisfied: X_{H5} is P, X_{H17} is G, X_{H22} is T, X_{H25} is R, and X_{H28} is V. In another specific embodiment of the preceding aspect and certain embodiments wherein at least one, two, three, or all of the following are satisfied: X_{H12} is K, X_{H13} is G, X_{H31} is A, and X_{H30} is L, at least three of the following are further satisfied: X_{H5} is P, X_{H17} is G, X_{H22} is T, X_{H25} is R, and X_{H28} is V. In another specific embodiment of the preceding aspect and certain embodiments wherein at least one, two, three, or all of the following are satisfied: X_{H12} is K, X_{H13} is G, X_{H31} is A, and X_{H30} is L, at least four of the following are further satisfied: X_{H5} is P, X_{H17} is G, X_{H22} is T, X_{H25} is R, and X_{H28} is V. In another specific embodiment of the preceding aspect and certain embodiments wherein at least one, two, three, or all of the following are satisfied: X_{H12} is K, X_{H13} is G, X_{H31} is A, and X_{H30} is L, the following are further satisfied: X_{H5} is P, X_{H17} is G, X_{H22} is T, X_{H25} is R, and X_{H28} is V.

[00148] In a further specific embodiment wherein at least one, two, three, or all of the following are satisfied: X_{H12} is K, X_{H13} is G, X_{H31} is A, and X_{H30} is L, and wherein at least one, two, three, four, or all of the following are satisfied: X_{H5} is P, X_{H17} is G, X_{H22} is T, X_{H25} is R, and X_{H28} is V, at least one of the following is further satisfied: X_{H3} is V, X_{H6} is A, X_{H16} is L, X_{H18} is M, X_{H19} is T, X_{H21} is T, and X_{H27} is D. In another further specific embodiment wherein at least one, two, three, or all of the following are satisfied: X_{H12} is K, X_{H13} is G, X_{H31} is A, and X_{H30} is L, and wherein at least one, two, three, four, or all of the following are satisfied: X_{H5} is P, X_{H17} is G, X_{H22} is T, X_{H25} is R, and X_{H28} is V, at least two of the following are further satisfied: X_{H3} is V, X_{H6} is A, X_{H16} is L, X_{H18} is M, X_{H19} is T, X_{H21} is T, and X_{H27} is D. In another further specific embodiment wherein at least one, two, three, or all of the following are satisfied: X_{H12} is K, X_{H13} is G, X_{H31} is A, and X_{H30} is L, and wherein at least one, two, three, four, or all of the following are satisfied: X_{H5} is P, X_{H17} is G, X_{H22} is T, X_{H25} is R, and X_{H28} is V, at least three of the following are further satisfied: X_{H3} is V, X_{H6} is A, X_{H16} is L, X_{H18} is M, X_{H19} is T, X_{H21} is T, and

X_{H27} is D. In another further specific embodiment wherein at least one, two, three, or all of the following are satisfied: X_{H12} is K, X_{H13} is G, X_{H31} is A, and X_{H30} is L, and wherein at least one, two, three, four, or all of the following are satisfied: X_{H5} is P, X_{H17} is G, X_{H22} is T, X_{H25} is R, and X_{H28} is V, at least four of the following are further satisfied: X_{H3} is V, X_{H6} is A, X_{H16} is L, X_{H18} is M, X_{H19} is T, X_{H21} is T, and X_{H27} is D. In another further specific embodiment wherein at least one, two, three, or all of the following are satisfied: X_{H12} is K, X_{H13} is G, X_{H31} is A, and X_{H30} is L, and wherein at least one, two, three, four, or all of the following are satisfied: X_{H5} is P, X_{H17} is G, X_{H22} is T, X_{H25} is R, and X_{H28} is V, at least five of the following are further satisfied: X_{H3} is V, X_{H6} is A, X_{H16} is L, X_{H18} is M, X_{H19} is T, X_{H21} is T, and X_{H27} is D. In another further specific embodiment wherein at least one, two, three, or all of the following are satisfied: X_{H12} is K, X_{H13} is G, X_{H31} is A, and X_{H30} is L, and wherein at least one, two, three, four, or all of the following are satisfied: X_{H5} is P, X_{H17} is G, X_{H22} is T, X_{H25} is R, and X_{H28} is V, at least six of the following are further satisfied: X_{H3} is V, X_{H6} is A, X_{H16} is L, X_{H18} is M, X_{H19} is T, X_{H21} is T, and X_{H27} is D. In another further specific embodiment wherein at least one, two, three, or all of the following are satisfied: X_{H12} is K, X_{H13} is G, X_{H31} is A, and X_{H30} is L, and wherein at least one, two, three, four, or all of the following are satisfied: X_{H5} is P, X_{H17} is G, X_{H22} is T, X_{H25} is R, and X_{H28} is V, the following is further satisfied: X_{H3} is V, X_{H6} is A, X_{H16} is L, X_{H18} is M, X_{H19} is T, X_{H21} is T, and X_{H27} is D.

[00149] In a specific embodiment of the preceding aspect and certain embodiments wherein at least one, two, three, or all of the following is satisfied: X_{H12} is K, X_{H13} is G, X_{H31} is A, and X_{H30} is L, at least one of the following is further satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V. In another specific embodiment of the preceding aspect and certain embodiments wherein at least one, two, three, or all of the following is satisfied: X_{H12} is K, X_{H13} is G, X_{H31} is A, and X_{H30} is L, at least two of the following are further satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V. In another specific embodiment of the preceding aspect and certain embodiments wherein at least one, two, three, or all of the following is satisfied: X_{H12} is K, X_{H13} is G, X_{H31} is A, and X_{H30} is L, at least three of the following are further satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V. In another specific embodiment of the preceding aspect and certain embodiments wherein at least one, two,

three, or all of the following is satisfied: X_{H12} is K, X_{H13} is G, X_{H31} is A, and X_{H30} is L, at least four of the following are further satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V. In another specific embodiment of the preceding aspect and certain embodiments wherein at least one, two, three, or all of the following is satisfied: X_{H12} is K, X_{H13} is G, X_{H31} is A, and X_{H30} is L, at least five of the following are further satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V. In another specific embodiment of the preceding aspect and certain embodiments wherein at least one, two, three, or all of the following is satisfied: X_{H12} is K, X_{H13} is G, X_{H31} is A, and X_{H30} is L, at least six of the following are further satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V. In another specific embodiment of the preceding aspect and certain embodiments wherein at least one, two, three, or all of the following is satisfied: X_{H12} is K, X_{H13} is G, X_{H31} is A, and X_{H30} is L, at least seven of the following are further satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V. In another specific embodiment of the preceding aspect and certain embodiments wherein at least one, two, three, or all of the following is satisfied: X_{H12} is K, X_{H13} is G, X_{H31} is A, and X_{H30} is L, at least eight of the following are further satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V. In another specific embodiment of the preceding aspect and certain embodiments wherein at least one, two, three, or all of the following is satisfied: X_{H12} is K, X_{H13} is G, X_{H31} is A, and X_{H30} is L, at least nine of the following are further satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V. In another specific embodiment of the preceding aspect and certain embodiments wherein at least one, two, three, or all of the following is satisfied: X_{H12} is K, X_{H13} is G, X_{H31} is A, and X_{H30} is L, at least ten of the following are further satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V. In another specific embodiment of the preceding aspect and certain embodiments wherein at least one, two, three, or all of the following is satisfied: X_{H12} is K, X_{H13} is G, X_{H31} is A, and X_{H30} is L, at least eleven of the following are further satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V. In another specific

embodiment of the preceding aspect and certain embodiments wherein at least one, two, three, or all of the following is satisfied: X_{H12} is K, X_{H13} is G, X_{H31} is A, and X_{H30} is L, the following is further satisfied: X_{H3} is V, X_{H5} is P, X_{H6} is A, X_{H16} is L, X_{H17} is G, X_{H18} is M, X_{H19} is T, X_{H21} is T, X_{H22} is T, X_{H25} is R, X_{H27} is D, and X_{H28} is V.

[00150] In specific embodiments of the preceding aspect, X_{H3} is M, X_{H6} is S, X_{H16} is F, X_{H18} is I, X_{H19} is R, X_{H21} is R, and X_{H27} is E.

[00151] In a specific embodiment, provided herein is an antibody or antigen-binding fragment thereof as listed in Table 1, which comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence listed in the second column of Table 1 for the antibody or antigen-binding fragment, VH FR2 comprises the amino acid sequence listed in the fourth column of Table 1 for the antibody or antigen-binding fragment, VH FR3 comprises the amino acid sequence listed in the sixth column of Table 1 for the antibody or antigen-binding fragment, and VH FR4 comprises the amino acid sequence listed in the eighth column of Table 1 for the antibody or antigen-binding fragment.

[00152] Table 1. Exemplary Antibodies with Specific VH FR sequences (X_{H1} is M or no amino acid).

Anti-body	VH - FR1	SEQ ID NO:	VH - FR2	SEQ ID NO:	VH - FR3	SEQ ID NO:	VH - FR4	SEQ ID NO:
Ab1	X_{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVITITRD RSMSTAYMELSSLR SEDAMYCYC	(SEQ ID NO: 14)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab2	X_{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVITITRD RSMSTAYMELSSLR SEDAMYCYC	(SEQ ID NO: 14)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab3	X_{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQDRVITITRD RSMSTAYMELSSLR AEDTAMYCYC	(SEQ ID NO: 18)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab4	X_{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQDRVITITRD RSMSTAYMELSSLR SEDAMYCYC	(SEQ ID NO: 14)	WGQGTTLVTVSS	(SEQ ID NO: 19)
Ab5	X_{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVITITRD RSMSTAYMELSSLR SEDAMYCYC	(SEQ ID NO: 14)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab6	X_{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVITITRD RSMSTAYMELSSLR AEDTAMYCYC	(SEQ ID NO: 18)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab7	X_{H1} QMQLVQSG	(SEQ ID NO: 12)	WVRQAPGKALE	(SEQ ID NO: 13)	YAQKFQDRVITITRD	(SEQ ID NO: 14)	WGQGTTLVTVSS	(SEQ ID NO: 15)

	AEVKKTGSSV KVSCAS	NO: 12)	WMG	NO: 13)	RSMSTAYMELSSLR SEDTAMYCC	NO: 14)		NO: 19)
Ab8	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVITITRD RSMSTAYMELSSLR AEDTAMYCC	(SEQ ID NO: 18)	WGQGTTLVTVSS	(SEQ ID NO: 15)
Ab9	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVITITRD RSMSTAYMELSSLR SEDTAMYCC	(SEQ ID NO: 14)	WGQGTTLVTVSS	(SEQ ID NO: 19)
Ab10	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQDRVITITRD RSMSTAYMELSSLR AEDTAMYCC	(SEQ ID NO: 18)	WGQGTTLVTVSS	(SEQ ID NO: 19)
Ab11	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVITITRD RSMSTAYMELSSLR AEDTAMYCC	(SEQ ID NO: 18)	WGQGTTLVTVSS	(SEQ ID NO: 15)
Ab12	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVITITRD RSMSTAYMELSSLR SEDTAMYCC	(SEQ ID NO: 14)	WGQGTTLVTVSS	(SEQ ID NO: 19)
Ab13	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVITITRD RSMSTAYMELSSLR AEDTAMYCC	(SEQ ID NO: 18)	WGQGTTLVTVSS	(SEQ ID NO: 19)
Ab14	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVITITRD RSMSTAYMELSSLR AEDTAMYCC	(SEQ ID NO: 18)	WGQGTTLVTVSS	(SEQ ID NO: 19)
Ab15	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVITITRD RSMSTAYMELSSLR AEDTAMYCC	(SEQ ID NO: 18)	WGQGTTLVTVSS	(SEQ ID NO: 19)
Ab16	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVITITRD RSMSTAYMELSSLR SEDTAMYCC	(SEQ ID NO: 14)	WGQGTTLVTVSS	(SEQ ID NO: 15)
Ab17	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSMSTAYMELSSLR SEDTAMYCC	(SEQ ID NO: 22)	WGQGTTLVTVSS	(SEQ ID NO: 15)
Ab18	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVITITRD RSTSTAYMELSSLR SEDTAMYCC	(SEQ ID NO: 23)	WGQGTTLVTVSS	(SEQ ID NO: 15)
Ab19	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVITITRD RSMSTAYMELRSLR SEDTAMYCC	(SEQ ID NO: 24)	WGQGTTLVTVSS	(SEQ ID NO: 15)
Ab20	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVITITRD RSMSTAYMELSSLR SEDTAVYYC	(SEQ ID NO: 25)	WGQGTTLVTVSS	(SEQ ID NO: 15)
Ab21	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSMSTAYMELSSLR SEDTAMYCC	(SEQ ID NO: 22)	WGQGTTLVTVSS	(SEQ ID NO: 15)
Ab22	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVITITRD RSTSTAYMELSSLR SEDTAMYCC	(SEQ ID NO: 23)	WGQGTTLVTVSS	(SEQ ID NO: 15)
Ab23	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVITITRD RSMSTAYMELRSLR SEDTAMYCC	(SEQ ID NO: 24)	WGQGTTLVTVSS	(SEQ ID NO: 15)
Ab24	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVITITRD RSMSTAYMELSSLR SEDTAVYYC	(SEQ ID NO: 25)	WGQGTTLVTVSS	(SEQ ID NO: 15)
Ab25	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSTSTAYMELSSLR SEDTAMYCC	(SEQ ID NO: 26)	WGQGTTLVTVSS	(SEQ ID NO: 15)

Ab26	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSMSTAYMELRSLR SEDAMYCC	(SEQ ID NO: 27)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab27	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSMSTAYMELSSLR SEDVAVYYC	(SEQ ID NO: 28)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab28	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVITITRD RSTSTAYMELRSLR SEDAMYCC	(SEQ ID NO: 29)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab29	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVITITRD RSTSTAYMELSSLR SEDVAVYYC	(SEQ ID NO: 30)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab30	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVITITRD RSMSTAYMELRSLR SEDVAVYYC	(SEQ ID NO: 31)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab31	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSTSTAYMELSSLR SEDAMYCC	(SEQ ID NO: 26)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab32	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSMSTAYMELRSLR SEDAMYCC	(SEQ ID NO: 27)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab33	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSMSTAYMELSSLR SEDVAVYYC	(SEQ ID NO: 28)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab34	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVITITRD RSTSTAYMELRSLR SEDAMYCC	(SEQ ID NO: 29)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab35	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVITITRD RSTSTAYMELSSLR SEDVAVYYC	(SEQ ID NO: 30)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab36	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVITITRD RSMSTAYMELRSLR SEDVAVYYC	(SEQ ID NO: 31)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab37	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSTSTAYMELRSLR SEDAMYCC	(SEQ ID NO: 32)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab38	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSTSTAYMELSSLR SEDVAVYYC	(SEQ ID NO: 33)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab39	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSMSTAYMELRSLR SEDVAVYYC	(SEQ ID NO: 34)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab40	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVITITRD RSTSTAYMELRSLR SEDVAVYYC	(SEQ ID NO: 35)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab41	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSTSTAYMELRSLR SEDAMYCC	(SEQ ID NO: 32)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab42	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSTSTAYMELSSLR SEDVAVYYC	(SEQ ID NO: 33)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab43	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSMSTAYMELRSLR SEDVAVYYC	(SEQ ID NO: 34)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab44	X _{H1} QMQLVQSG AEVKKPGSSV	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVITITRD RSTSTAYMELRSLR	(SEQ ID NO: 35)	WGQGTTVTVSS	(SEQ ID NO: 15)

	KVSCAS				SEDTAVYYC			
Ab45	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSTSTAYMELRSLR SEDTAVYYC	(SEQ ID NO: 36)	WGQGT TVTVSS	(SEQ ID NO: 15)
Ab46	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSTSTAYMELRSLR SEDTAVYYC	(SEQ ID NO: 36)	WGQGT TVTVSS	(SEQ ID NO: 15)
Ab47	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVITITRD RSMSTAYMELSSLR SEDTAMYCC	(SEQ ID NO: 14)	WGQGT TVTVSS	(SEQ ID NO: 15)
Ab48	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSMSTAYMELSSLR SEDTAMYCC	(SEQ ID NO: 22)	WGQGT TVTVSS	(SEQ ID NO: 15)
Ab49	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVITITRD RSTSTAYMELSSLR SEDTAMYCC	(SEQ ID NO: 23)	WGQGT TVTVSS	(SEQ ID NO: 15)
Ab50	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVITITRD RSMSTAYMELRSLR SEDTAMYCC	(SEQ ID NO: 24)	WGQGT TVTVSS	(SEQ ID NO: 15)
Ab51	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVITITRD RSMSTAYMELSSLR SEDTAVYYC	(SEQ ID NO: 25)	WGQGT TVTVSS	(SEQ ID NO: 15)
Ab52	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSMSTAYMELSSLR SEDTAMYCC	(SEQ ID NO: 22)	WGQGT TVTVSS	(SEQ ID NO: 15)
Ab53	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVITITRD RSTSTAYMELSSLR SEDTAMYCC	(SEQ ID NO: 23)	WGQGT TVTVSS	(SEQ ID NO: 15)
Ab54	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVITITRD RSMSTAYMELRSLR SEDTAMYCC	(SEQ ID NO: 24)	WGQGT TVTVSS	(SEQ ID NO: 15)
Ab55	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVITITRD RSMSTAYMELSSLR SEDTAVYYC	(SEQ ID NO: 25)	WGQGT TVTVSS	(SEQ ID NO: 15)
Ab56	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSTSTAYMELSSLR SEDTAMYCC	(SEQ ID NO: 26)	WGQGT TVTVSS	(SEQ ID NO: 15)
Ab57	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSMSTAYMELRSLR SEDTAMYCC	(SEQ ID NO: 27)	WGQGT TVTVSS	(SEQ ID NO: 15)
Ab58	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSMSTAYMELSSLR SEDTAVYYC	(SEQ ID NO: 28)	WGQGT TVTVSS	(SEQ ID NO: 15)
Ab59	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVITITRD RSTSTAYMELRSLR SEDTAMYCC	(SEQ ID NO: 29)	WGQGT TVTVSS	(SEQ ID NO: 15)
Ab60	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVITITRD RSTSTAYMELSSLR SEDTAVYYC	(SEQ ID NO: 30)	WGQGT TVTVSS	(SEQ ID NO: 15)
Ab61	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVITITRD RSMSTAYMELRSLR SEDTAVYYC	(SEQ ID NO: 31)	WGQGT TVTVSS	(SEQ ID NO: 15)
Ab62	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSTSTAYMELSSLR SEDTAMYCC	(SEQ ID NO: 26)	WGQGT TVTVSS	(SEQ ID NO: 15)
Ab63	X _{H1} QMQLVQSG	(SEQ ID	WVRQAPGQGLE	(SEQ ID	YAQKFQGRVTITRD	(SEQ ID	WGQGT TVTVSS	(SEQ ID

	AEVKKPGSSV KVSCAS	NO: 21)	WMG	NO: 16)	RSMSTAYMELRSLR SEDTAMYCC	NO: 27)		NO: 15)
Ab64	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSMSTAYMELSSLR SEDTAVYYC	(SEQ ID NO: 28)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab65	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVITITRD RSTSTAYMELRSLR SEDTAMYCC	(SEQ ID NO: 29)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab66	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVITITRD RSTSTAYMELSSLR SEDTAVYYC	(SEQ ID NO: 30)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab67	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVITITRD RSMSTAYMELRSLR SEDTAVYYC	(SEQ ID NO: 31)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab68	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSTSTAYMELRSLR SEDTAMYCC	(SEQ ID NO: 32)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab69	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSTSTAYMELSSLR SEDTAVYYC	(SEQ ID NO: 33)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab70	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSMSTAYMELRSLR SEDTAVYYC	(SEQ ID NO: 34)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab71	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVITITRD RSTSTAYMELRSLR SEDTAVYYC	(SEQ ID NO: 35)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab72	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSTSTAYMELRSLR SEDTAMYCC	(SEQ ID NO: 32)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab73	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSTSTAYMELSSLR SEDTAVYYC	(SEQ ID NO: 33)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab74	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSMSTAYMELRSLR SEDTAVYYC	(SEQ ID NO: 34)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab75	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVITITRD RSTSTAYMELRSLR SEDTAVYYC	(SEQ ID NO: 35)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab76	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSTSTAYMELRSLR SEDTAVYYC	(SEQ ID NO: 36)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab77	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSTSTAYMELRSLR SEDTAVYYC	(SEQ ID NO: 36)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab78	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQDRVITITRD RSMSTAYMELSSLR AEDTAMYCC	(SEQ ID NO: 18)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab79	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQGRVTITRD RSMSTAYMELSSLR AEDTAMYCC	(SEQ ID NO: 37)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab80	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQDRVITITRD RSTSTAYMELSSLR AEDTAMYCC	(SEQ ID NO: 38)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab81	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQDRVITITRD RSMSTAYMELRSLR AEDTAMYCC	(SEQ ID NO: 39)	WGQGTTVTVSS	(SEQ ID NO: 15)

Ab82	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQDRVITITRD RSMSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 40)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab83	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQGRVTITRD RSMSTAYMELSSLR AEDTAMYVC	(SEQ ID NO: 37)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab84	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQDRVITITRD RSTSTAYMELSSLR AEDTAMYVC	(SEQ ID NO: 38)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab85	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQDRVITITRD RSMSTAYMELRSLR AEDTAMYVC	(SEQ ID NO: 39)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab86	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQDRVITITRD RSMSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 40)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab87	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQGRVTITRD RSTSTAYMELSSLR AEDTAMYVC	(SEQ ID NO: 41)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab88	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQGRVTITRD RSMSTAYMELRSLR AEDTAMYVC	(SEQ ID NO: 42)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab89	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQGRVTITRD RSMSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 43)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab90	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQDRVITITRD RSTSTAYMELRSLR AEDTAMYVC	(SEQ ID NO: 44)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab91	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQDRVITITRD RSTSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 45)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab92	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQDRVITITRD RSMSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 46)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab93	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQGRVTITRD RSTSTAYMELSSLR AEDTAMYVC	(SEQ ID NO: 41)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab94	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQGRVTITRD RSMSTAYMELRSLR AEDTAMYVC	(SEQ ID NO: 42)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab95	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQGRVTITRD RSMSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 43)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab96	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQDRVITITRD RSTSTAYMELRSLR AEDTAMYVC	(SEQ ID NO: 44)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab97	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQDRVITITRD RSTSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 45)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab98	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQDRVITITRD RSMSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 46)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab99	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQGRVTITRD RSTSTAYMELRSLR AEDTAMYVC	(SEQ ID NO: 47)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab100	X _{H1} QMQLVQSG AEVKKTGSSV	(SEQ ID NO: 12)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQGRVTITRD RSTSTAYMELSSLR	(SEQ ID NO: 48)	WGQGTTVTVSS	(SEQ ID NO: 15)

	KVSCAS				AEDTAVYYC			
Ab101	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQGRVTITRD RSMSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 49)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab102	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQDRVITITRD RSTSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 50)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab103	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQGRVTITRD RSTSTAYMELRSLR AEDTAMYYC	(SEQ ID NO: 47)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab104	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQGRVTITRD RSTSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 48)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab105	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQGRVTITRD RSMSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 49)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab106	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQDRVITITRD RSTSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 50)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab107	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQGRVTITRD RSTSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 139)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab108	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQGRVTITRD RSTSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 139)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab109	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQDRVITITRD RSMSTAYMELSSLR SEDAMYYC	(SEQ ID NO: 14)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab110	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQGRVTITRD RSMSTAYMELSSLR SEDAMYYC	(SEQ ID NO: 22)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab111	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQDRVITITRD RSTSTAYMELSSLR SEDAMYYC	(SEQ ID NO: 23)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab112	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQDRVITITRD RSMSTAYMELRSLR SEDAMYYC	(SEQ ID NO: 24)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab113	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQDRVITITRD RSMSTAYMELSSLR SEDAMYYC	(SEQ ID NO: 25)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab114	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQGRVTITRD RSMSTAYMELSSLR SEDAMYYC	(SEQ ID NO: 22)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab115	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQDRVITITRD RSTSTAYMELSSLR SEDAMYYC	(SEQ ID NO: 23)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab116	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQDRVITITRD RSMSTAYMELRSLR SEDAMYYC	(SEQ ID NO: 24)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab117	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQDRVITITRD RSMSTAYMELSSLR SEDAMYYC	(SEQ ID NO: 25)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab118	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQGRVTITRD RSTSTAYMELSSLR SEDAMYYC	(SEQ ID NO: 26)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab119	X _{H1} QMQLVQSG	(SEQ ID	WVRQAPGQALE	(SEQ ID	YAQKFQGRVTITRD	(SEQ ID	WGQGLVTVSS	(SEQ ID

	AEVKKTGSSV KVSCAS	NO: 12)	WMG	NO: 17)	RSMSTAYMELRSLR SEDTAMYCC	NO: 27)		NO: 19)
Ab120	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQGRVTITRD RSMSTAYMELSSLR SEDTAVYYC	(SEQ ID NO: 28)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab121	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQDRVTITRD RSTSTAYMELRSLR SEDTAMYCC	(SEQ ID NO: 29)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab122	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQDRVTITRD RSTSTAYMELSSLR SEDTAVYYC	(SEQ ID NO: 30)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab123	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQDRVTITRD RSMSTAYMELRSLR SEDTAVYYC	(SEQ ID NO: 31)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab124	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQGRVTITRD RSTSTAYMELSSLR SEDTAMYCC	(SEQ ID NO: 26)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab125	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQGRVTITRD RSMSTAYMELRSLR SEDTAMYCC	(SEQ ID NO: 27)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab126	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQGRVTITRD RSMSTAYMELSSLR SEDTAVYYC	(SEQ ID NO: 28)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab127	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQDRVTITRD RSTSTAYMELRSLR SEDTAMYCC	(SEQ ID NO: 29)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab128	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQDRVTITRD RSTSTAYMELSSLR SEDTAVYYC	(SEQ ID NO: 30)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab129	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQDRVTITRD RSMSTAYMELRSLR SEDTAVYYC	(SEQ ID NO: 31)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab130	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQGRVTITRD RSTSTAYMELRSLR SEDTAMYCC	(SEQ ID NO: 32)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab131	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQGRVTITRD RSTSTAYMELSSLR SEDTAVYYC	(SEQ ID NO: 33)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab132	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQGRVTITRD RSMSTAYMELRSLR SEDTAVYYC	(SEQ ID NO: 34)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab133	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQGRVTITRD RSTSTAYMELRSLR SEDTAVYYC	(SEQ ID NO: 35)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab134	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQGRVTITRD RSTSTAYMELRSLR SEDTAMYCC	(SEQ ID NO: 32)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab135	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQGRVTITRD RSTSTAYMELSSLR SEDTAVYYC	(SEQ ID NO: 33)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab136	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQGRVTITRD RSMSTAYMELRSLR SEDTAVYYC	(SEQ ID NO: 34)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab137	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQDRVTITRD RSTSTAYMELRSLR SEDTAVYYC	(SEQ ID NO: 35)	WGQGLTVTVSS	(SEQ ID NO: 19)

Ab138	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQGRVTITRD RSTSTAYMELRSLR SEDTAVYYC	(SEQ ID NO: 36)	WGQGTTLVTVSS	(SEQ ID NO: 19)
Ab139	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQGRVTITRD RSTSTAYMELRSLR SEDTAVYYC	(SEQ ID NO: 36)	WGQGTTLVTVSS	(SEQ ID NO: 19)
Ab140	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVITITRD RSMSTAYMELSSLR SEDTAMYCC	(SEQ ID NO: 14)	WGQGTTTVTVSS	(SEQ ID NO: 15)
Ab141	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSMSTAYMELSSLR SEDTAMYCC	(SEQ ID NO: 22)	WGQGTTTVTVSS	(SEQ ID NO: 15)
Ab142	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVITITRD RSTSTAYMELSSLR SEDTAMYCC	(SEQ ID NO: 23)	WGQGTTTVTVSS	(SEQ ID NO: 15)
Ab143	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVITITRD RSMSTAYMELRSLR SEDTAMYCC	(SEQ ID NO: 24)	WGQGTTTVTVSS	(SEQ ID NO: 15)
Ab144	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVITITRD RSMSTAYMELSSLR SEDTAVYYC	(SEQ ID NO: 25)	WGQGTTTVTVSS	(SEQ ID NO: 15)
Ab145	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSMSTAYMELSSLR SEDTAMYCC	(SEQ ID NO: 22)	WGQGTTTVTVSS	(SEQ ID NO: 15)
Ab146	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVITITRD RSTSTAYMELSSLR SEDTAMYCC	(SEQ ID NO: 23)	WGQGTTTVTVSS	(SEQ ID NO: 15)
Ab147	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVITITRD RSMSTAYMELRSLR SEDTAMYCC	(SEQ ID NO: 24)	WGQGTTTVTVSS	(SEQ ID NO: 15)
Ab148	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVITITRD RSMSTAYMELSSLR SEDTAVYYC	(SEQ ID NO: 25)	WGQGTTTVTVSS	(SEQ ID NO: 15)
Ab149	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSTSTAYMELSSLR SEDTAMYCC	(SEQ ID NO: 26)	WGQGTTTVTVSS	(SEQ ID NO: 15)
Ab150	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSMSTAYMELRSLR SEDTAMYCC	(SEQ ID NO: 27)	WGQGTTTVTVSS	(SEQ ID NO: 15)
Ab151	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSMSTAYMELSSLR SEDTAVYYC	(SEQ ID NO: 28)	WGQGTTTVTVSS	(SEQ ID NO: 15)
Ab152	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVITITRD RSTSTAYMELRSLR SEDTAMYCC	(SEQ ID NO: 29)	WGQGTTTVTVSS	(SEQ ID NO: 15)
Ab153	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVITITRD RSTSTAYMELSSLR SEDTAVYYC	(SEQ ID NO: 30)	WGQGTTTVTVSS	(SEQ ID NO: 15)
Ab154	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVITITRD RSMSTAYMELRSLR SEDTAVYYC	(SEQ ID NO: 31)	WGQGTTTVTVSS	(SEQ ID NO: 15)
Ab155	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSTSTAYMELSSLR SEDTAMYCC	(SEQ ID NO: 26)	WGQGTTTVTVSS	(SEQ ID NO: 15)
Ab156	X _{H1} QMQLVQSG AEVKKPGSSV	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSMSTAYMELRSLR	(SEQ ID NO: 27)	WGQGTTTVTVSS	(SEQ ID NO: 15)

	KVSCAS				SEDAMYYC			
Ab157	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSMSTAYMELSSLR SEDAMYYC	(SEQ ID NO: 28)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab158	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVTITRD RSTSTAYMELRSLR SEDAMYYC	(SEQ ID NO: 29)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab159	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVTITRD RSTSTAYMELSSLR SEDAMYYC	(SEQ ID NO: 30)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab160	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVTITRD RSMSTAYMELRSLR SEDAMYYC	(SEQ ID NO: 31)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab161	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSTSTAYMELRSLR SEDAMYYC	(SEQ ID NO: 32)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab162	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSTSTAYMELSSLR SEDAMYYC	(SEQ ID NO: 33)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab163	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSMSTAYMELRSLR SEDAMYYC	(SEQ ID NO: 34)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab164	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVTITRD RSTSTAYMELRSLR SEDAMYYC	(SEQ ID NO: 35)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab165	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSTSTAYMELRSLR SEDAMYYC	(SEQ ID NO: 32)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab166	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSTSTAYMELSSLR SEDAMYYC	(SEQ ID NO: 33)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab167	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSMSTAYMELRSLR SEDAMYYC	(SEQ ID NO: 34)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab168	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVTITRD RSTSTAYMELRSLR SEDAMYYC	(SEQ ID NO: 35)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab169	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSTSTAYMELRSLR SEDAMYYC	(SEQ ID NO: 36)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab170	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSTSTAYMELRSLR SEDAMYYC	(SEQ ID NO: 36)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab171	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVTITRD RSMSTAYMELSSLR AEDTAMYYC	(SEQ ID NO: 18)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab172	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSMSTAYMELSSLR AEDTAMYYC	(SEQ ID NO: 37)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab173	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVTITRD RSTSTAYMELSSLR AEDTAMYYC	(SEQ ID NO: 38)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab174	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVTITRD RSMSTAYMELRSLR AEDTAMYYC	(SEQ ID NO: 39)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab175	X _{H1} QMQLVQSG	(SEQ ID	WVRQAPGKALE	(SEQ ID	YAQKFQDRVTITRD	(SEQ ID	WGQGTTVTVSS	(SEQ ID

	AEVKKTGSSV KVSCAS	NO: 12)	WMG	NO: 13)	RSMSTAYMELSSLR AEDTAVYYC	NO: 40)		NO: 15)
Ab176	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSMSTAYMELSSLR AEDTAMYYC	(SEQ ID NO: 37)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab177	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVITITRD RSTSTAYMELSSLR AEDTAMYYC	(SEQ ID NO: 38)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab178	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVITITRD RSMSTAYMELRSLR AEDTAMYYC	(SEQ ID NO: 39)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab179	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVITITRD RSMSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 40)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab180	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSTSTAYMELSSLR AEDTAMYYC	(SEQ ID NO: 41)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab181	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSMSTAYMELRSLR AEDTAMYYC	(SEQ ID NO: 42)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab182	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSMSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 43)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab183	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVITITRD RSTSTAYMELRSLR AEDTAMYYC	(SEQ ID NO: 44)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab184	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVITITRD RSTSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 45)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab185	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVITITRD RSMSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 46)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab186	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSTSTAYMELSSLR AEDTAMYYC	(SEQ ID NO: 41)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab187	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSMSTAYMELRSLR AEDTAMYYC	(SEQ ID NO: 42)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab188	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSMSTAYMELSSLR AEDTAMYYC	(SEQ ID NO: 43)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab189	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVITITRD RSTSTAYMELRSLR AEDTAMYYC	(SEQ ID NO: 44)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab190	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVITITRD RSTSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 45)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab191	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVITITRD RSMSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 46)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab192	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSTSTAYMELRSLR AEDTAMYYC	(SEQ ID NO: 47)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab193	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSTSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 48)	WGQGTTVTVSS	(SEQ ID NO: 15)

Ab194	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSMSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 49)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab195	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVITITRD RSTSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 50)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab196	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSTSTAYMELRSLR AEDTAMYYC	(SEQ ID NO: 47)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab197	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSTSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 48)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab198	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSMSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 49)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab199	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVITITRD RSTSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 50)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab200	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSTSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 139)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab201	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSTSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 139)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab202	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVITITRD RSMSTAYMELSSLR SEDAMYYC	(SEQ ID NO: 14)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab203	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSMSTAYMELSSLR SEDAMYYC	(SEQ ID NO: 22)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab204	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVITITRD RSTSTAYMELSSLR SEDAMYYC	(SEQ ID NO: 23)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab205	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVITITRD RSMSTAYMELRSLR SEDAMYYC	(SEQ ID NO: 24)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab206	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVITITRD RSMSTAYMELSSLR SEDAMYYC	(SEQ ID NO: 25)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab207	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSMSTAYMELSSLR SEDAMYYC	(SEQ ID NO: 22)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab208	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVITITRD RSTSTAYMELSSLR SEDAMYYC	(SEQ ID NO: 23)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab209	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVITITRD RSMSTAYMELRSLR SEDAMYYC	(SEQ ID NO: 24)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab210	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVITITRD RSMSTAYMELSSLR SEDAMYYC	(SEQ ID NO: 25)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab211	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSTSTAYMELSSLR SEDAMYYC	(SEQ ID NO: 26)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab212	X _{H1} QMQLVQSG AEVKKTGSSV	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSMSTAYMELRSLR	(SEQ ID NO: 27)	WGQGLVTVSS	(SEQ ID NO: 19)

	KVSCAS				SEDAMYYC			
Ab213	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSMSTAYMELSSLR SEDAMYYC	(SEQ ID NO: 28)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab214	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVTITRD RSTSTAYMELRSLR SEDAMYYC	(SEQ ID NO: 29)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab215	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVTITRD RSTSTAYMELSSLR SEDAMYYC	(SEQ ID NO: 30)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab216	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVTITRD RSMSTAYMELRSLR SEDAMYYC	(SEQ ID NO: 31)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab217	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSTSTAYMELSSLR SEDAMYYC	(SEQ ID NO: 26)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab218	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSMSTAYMELRSLR SEDAMYYC	(SEQ ID NO: 27)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab219	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSMSTAYMELSSLR SEDAMYYC	(SEQ ID NO: 28)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab220	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVTITRD RSTSTAYMELRSLR SEDAMYYC	(SEQ ID NO: 29)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab221	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVTITRD RSTSTAYMELSSLR SEDAMYYC	(SEQ ID NO: 30)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab222	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVTITRD RSMSTAYMELRSLR SEDAMYYC	(SEQ ID NO: 31)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab223	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSTSTAYMELRSLR SEDAMYYC	(SEQ ID NO: 32)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab224	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSTSTAYMELSSLR SEDAMYYC	(SEQ ID NO: 33)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab225	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSMSTAYMELRSLR SEDAMYYC	(SEQ ID NO: 34)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab226	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVTITRD RSTSTAYMELRSLR SEDAMYYC	(SEQ ID NO: 35)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab227	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSTSTAYMELRSLR SEDAMYYC	(SEQ ID NO: 32)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab228	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSTSTAYMELSSLR SEDAMYYC	(SEQ ID NO: 33)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab229	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSMSTAYMELRSLR SEDAMYYC	(SEQ ID NO: 34)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab230	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVTITRD RSTSTAYMELRSLR SEDAMYYC	(SEQ ID NO: 35)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab231	X _{H1} QMQLVQSG	(SEQ ID	WVRQAPGKALE	(SEQ ID	YAQKFQGRVTITRD	(SEQ ID	WGQGLVTVSS	(SEQ ID

	AEVKKTGSSV KVSCAS	NO: 12)	WMG	NO: 13)	RSTSTAYMELRSLR SEDTAVYYC	NO: 36)		NO: 19)
Ab232	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSTSTAYMELRSLR SEDTAVYYC	(SEQ ID NO: 36)	WGQGTTLTVVSS	(SEQ ID NO: 19)
Ab233	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVTITRD RSMSTAYMELSSLR AEDTAMYYC	(SEQ ID NO: 18)	WGQGTTLTVVSS	(SEQ ID NO: 15)
Ab234	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSMSTAYMELSSLR AEDTAMYYC	(SEQ ID NO: 37)	WGQGTTLTVVSS	(SEQ ID NO: 15)
Ab235	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVTITRD RSTSTAYMELSSLR AEDTAMYYC	(SEQ ID NO: 38)	WGQGTTLTVVSS	(SEQ ID NO: 15)
Ab236	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVTITRD RSMSTAYMELRSLR AEDTAMYYC	(SEQ ID NO: 39)	WGQGTTLTVVSS	(SEQ ID NO: 15)
Ab237	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVTITRD RSMSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 40)	WGQGTTLTVVSS	(SEQ ID NO: 15)
Ab238	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSMSTAYMELSSLR AEDTAMYYC	(SEQ ID NO: 37)	WGQGTTLTVVSS	(SEQ ID NO: 15)
Ab239	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVTITRD RSTSTAYMELSSLR AEDTAMYYC	(SEQ ID NO: 38)	WGQGTTLTVVSS	(SEQ ID NO: 15)
Ab240	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVTITRD RSMSTAYMELRSLR AEDTAMYYC	(SEQ ID NO: 39)	WGQGTTLTVVSS	(SEQ ID NO: 15)
Ab241	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVTITRD RSMSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 40)	WGQGTTLTVVSS	(SEQ ID NO: 15)
Ab242	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSTSTAYMELSSLR AEDTAMYYC	(SEQ ID NO: 41)	WGQGTTLTVVSS	(SEQ ID NO: 15)
Ab243	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSMSTAYMELRSLR AEDTAMYYC	(SEQ ID NO: 42)	WGQGTTLTVVSS	(SEQ ID NO: 15)
Ab244	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSMSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 43)	WGQGTTLTVVSS	(SEQ ID NO: 15)
Ab245	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVTITRD RSTSTAYMELRSLR AEDTAMYYC	(SEQ ID NO: 44)	WGQGTTLTVVSS	(SEQ ID NO: 15)
Ab246	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVTITRD RSTSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 45)	WGQGTTLTVVSS	(SEQ ID NO: 15)
Ab247	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVTITRD RSMSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 46)	WGQGTTLTVVSS	(SEQ ID NO: 15)
Ab248	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSTSTAYMELSSLR AEDTAMYYC	(SEQ ID NO: 41)	WGQGTTLTVVSS	(SEQ ID NO: 15)
Ab249	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSMSTAYMELRSLR AEDTAMYYC	(SEQ ID NO: 42)	WGQGTTLTVVSS	(SEQ ID NO: 15)

Ab250	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSMSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 43)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab251	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVITITRD RSTSTAYMELRSLR AEDTAMYC	(SEQ ID NO: 44)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab252	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVITITRD RSTSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 45)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab253	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVITITRD RSMSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 46)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab254	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSTSTAYMELRSLR AEDTAMYC	(SEQ ID NO: 47)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab255	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSTSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 48)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab256	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSMSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 49)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab257	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVITITRD RSTSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 50)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab258	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSTSTAYMELRSLR AEDTAMYC	(SEQ ID NO: 47)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab259	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSTSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 48)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab260	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSMSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 49)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab261	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVITITRD RSTSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 50)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab262	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSTSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 139)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab263	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSTSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 139)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab264	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVITITRD RSMSTAYMELSSLR SEDAMYC	(SEQ ID NO: 14)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab265	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSMSTAYMELSSLR SEDAMYC	(SEQ ID NO: 22)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab266	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVITITRD RSTSTAYMELSSLR SEDAMYC	(SEQ ID NO: 23)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab267	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVITITRD RSMSTAYMELRSLR SEDAMYC	(SEQ ID NO: 24)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab268	X _{H1} QMQLVQSG AEVKKTGSSV	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVITITRD RSMSTAYMELSSLR	(SEQ ID NO: 25)	WGQGLTVTVSS	(SEQ ID NO: 19)

	KVSCAS				SEDTAVYYC			
Ab269	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSMSTAYMELSSLR SEDTAMYYC	(SEQ ID NO: 22)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab270	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVTITRD RSTSTAYMELSSLR SEDTAMYYC	(SEQ ID NO: 23)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab271	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVTITRD RSMSTAYMELRSLR SEDTAMYYC	(SEQ ID NO: 24)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab272	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVTITRD RSMSTAYMELSSLR SEDTAVYYC	(SEQ ID NO: 25)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab273	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSTSTAYMELSSLR SEDTAMYYC	(SEQ ID NO: 26)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab274	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSMSTAYMELRSLR SEDTAMYYC	(SEQ ID NO: 27)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab275	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSMSTAYMELSSLR SEDTAVYYC	(SEQ ID NO: 28)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab276	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVTITRD RSTSTAYMELRSLR SEDTAMYYC	(SEQ ID NO: 29)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab277	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVTITRD RSTSTAYMELSSLR SEDTAVYYC	(SEQ ID NO: 30)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab278	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVTITRD RSMSTAYMELRSLR SEDTAVYYC	(SEQ ID NO: 31)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab279	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSTSTAYMELSSLR SEDTAMYYC	(SEQ ID NO: 26)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab280	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSMSTAYMELRSLR SEDTAMYYC	(SEQ ID NO: 27)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab281	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSMSTAYMELSSLR SEDTAVYYC	(SEQ ID NO: 28)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab282	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVTITRD RSTSTAYMELRSLR SEDTAMYYC	(SEQ ID NO: 29)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab283	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVTITRD RSTSTAYMELSSLR SEDTAVYYC	(SEQ ID NO: 30)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab284	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVTITRD RSMSTAYMELRSLR SEDTAVYYC	(SEQ ID NO: 31)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab285	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSTSTAYMELRSLR SEDTAMYYC	(SEQ ID NO: 32)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab286	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSTSTAYMELSSLR SEDTAVYYC	(SEQ ID NO: 33)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab287	X _{H1} QMQLVQSG	(SEQ ID	WVRQAPGQGLE	(SEQ ID	YAQKFQGRVTITRD	(SEQ ID	WGQGLTVTVSS	(SEQ ID

	AEVKKTGSSV KVSCAS	NO: 12)	WMG	NO: 16)	RSMSTAYMELRSLR SEDTAVYYC	NO: 34)		NO: 19)
Ab288	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVITITRD RSTSTAYMELRSLR SEDTAVYYC	(SEQ ID NO: 35)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab289	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSTSTAYMELRSLR SEDTAMYYC	(SEQ ID NO: 32)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab290	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSTSTAYMELSSLR SEDTAVYYC	(SEQ ID NO: 33)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab291	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSMSTAYMELRSLR SEDTAVYYC	(SEQ ID NO: 34)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab292	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVITITRD RSTSTAYMELRSLR SEDTAVYYC	(SEQ ID NO: 35)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab293	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSTSTAYMELRSLR SEDTAVYYC	(SEQ ID NO: 36)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab294	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSTSTAYMELRSLR SEDTAVYYC	(SEQ ID NO: 36)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab295	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQDRVITITRD RSMSTAYMELSSLR AEDTAMYYC	(SEQ ID NO: 18)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab296	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQGRVTITRD RSMSTAYMELSSLR AEDTAMYYC	(SEQ ID NO: 37)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab297	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQDRVITITRD RSTSTAYMELSSLR AEDTAMYYC	(SEQ ID NO: 38)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab298	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQDRVITITRD RSMSTAYMELRSLR AEDTAMYYC	(SEQ ID NO: 39)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab299	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQDRVITITRD RSMSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 40)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab300	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQGRVTITRD RSMSTAYMELSSLR AEDTAMYYC	(SEQ ID NO: 37)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab301	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQDRVITITRD RSTSTAYMELSSLR AEDTAMYYC	(SEQ ID NO: 38)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab302	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQDRVITITRD RSMSTAYMELRSLR AEDTAMYYC	(SEQ ID NO: 39)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab303	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQDRVITITRD RSMSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 40)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab304	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQGRVTITRD RSTSTAYMELSSLR AEDTAMYYC	(SEQ ID NO: 41)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab305	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQGRVTITRD RSMSTAYMELRSLR AEDTAMYYC	(SEQ ID NO: 42)	WGQGLTVTVSS	(SEQ ID NO: 19)

Ab306	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQGRVTITRD RSMSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 43)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab307	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQDRVITITRD RSTSTAYMELRSLR AEDTAMYCC	(SEQ ID NO: 44)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab308	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQDRVITITRD RSTSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 45)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab309	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQDRVITITRD RSMSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 46)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab310	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQGRVTITRD RSTSTAYMELSSLR AEDTAMYCC	(SEQ ID NO: 41)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab311	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQGRVTITRD RSMSTAYMELRSLR AEDTAMYCC	(SEQ ID NO: 42)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab312	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQGRVTITRD RSMSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 43)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab313	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQDRVITITRD RSTSTAYMELRSLR AEDTAMYCC	(SEQ ID NO: 44)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab314	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQDRVITITRD RSTSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 45)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab315	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQDRVITITRD RSMSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 46)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab316	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQGRVTITRD RSTSTAYMELRSLR AEDTAMYCC	(SEQ ID NO: 47)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab317	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQGRVTITRD RSTSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 48)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab318	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQGRVTITRD RSMSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 49)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab319	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQDRVITITRD RSTSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 50)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab320	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQGRVTITRD RSTSTAYMELRSLR AEDTAMYCC	(SEQ ID NO: 47)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab321	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQGRVTITRD RSTSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 48)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab322	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQGRVTITRD RSMSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 49)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab323	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQDRVITITRD RSTSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 50)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab324	X _{H1} QMQLVQSG AEVKKTGSSV	(SEQ ID NO: 12)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQGRVTITRD RSTSTAYMELRSLR	(SEQ ID NO: 139)	WGQGLVTVSS	(SEQ ID NO: 19)

	KVSCAS				AEDTAVYYC			
Ab325	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQALE WMG	(SEQ ID NO: 17)	YAQKFQGRVTITRD RSTSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 139)	WGQGTTLTVVSS	(SEQ ID NO: 19)
Ab326	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVTITRD RSMSTAYMELSSLR AEDTAMYYC	(SEQ ID NO: 18)	WGQGTTVTVVSS	(SEQ ID NO: 15)
Ab327	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSMSTAYMELSSLR AEDTAMYYC	(SEQ ID NO: 37)	WGQGTTVTVVSS	(SEQ ID NO: 15)
Ab328	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVTITRD RSTSTAYMELSSLR AEDTAMYYC	(SEQ ID NO: 38)	WGQGTTVTVVSS	(SEQ ID NO: 15)
Ab329	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVTITRD RSMSTAYMELRSLR AEDTAMYYC	(SEQ ID NO: 39)	WGQGTTVTVVSS	(SEQ ID NO: 15)
Ab330	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVTITRD RSMSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 40)	WGQGTTVTVVSS	(SEQ ID NO: 15)
Ab331	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSMSTAYMELSSLR AEDTAMYYC	(SEQ ID NO: 37)	WGQGTTVTVVSS	(SEQ ID NO: 15)
Ab332	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVTITRD RSTSTAYMELSSLR AEDTAMYYC	(SEQ ID NO: 38)	WGQGTTVTVVSS	(SEQ ID NO: 15)
Ab333	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVTITRD RSMSTAYMELRSLR AEDTAMYYC	(SEQ ID NO: 39)	WGQGTTVTVVSS	(SEQ ID NO: 15)
Ab334	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVTITRD RSMSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 40)	WGQGTTVTVVSS	(SEQ ID NO: 15)
Ab335	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSTSTAYMELSSLR AEDTAMYYC	(SEQ ID NO: 41)	WGQGTTVTVVSS	(SEQ ID NO: 15)
Ab336	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSMSTAYMELRSLR AEDTAMYYC	(SEQ ID NO: 42)	WGQGTTVTVVSS	(SEQ ID NO: 15)
Ab337	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSMSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 43)	WGQGTTVTVVSS	(SEQ ID NO: 15)
Ab338	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVTITRD RSTSTAYMELRSLR AEDTAMYYC	(SEQ ID NO: 44)	WGQGTTVTVVSS	(SEQ ID NO: 15)
Ab339	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVTITRD RSTSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 45)	WGQGTTVTVVSS	(SEQ ID NO: 15)
Ab340	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVTITRD RSMSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 46)	WGQGTTVTVVSS	(SEQ ID NO: 15)
Ab341	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSTSTAYMELSSLR AEDTAMYYC	(SEQ ID NO: 41)	WGQGTTVTVVSS	(SEQ ID NO: 15)
Ab342	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSMSTAYMELRSLR AEDTAMYYC	(SEQ ID NO: 42)	WGQGTTVTVVSS	(SEQ ID NO: 15)
Ab343	X _{H1} QMQLVQSG	(SEQ ID	WVRQAPGKGLE	(SEQ ID	YAQKFQGRVTITRD	(SEQ ID	WGQGTTVTVVSS	(SEQ ID

	AEVKKPGSSV KVSCAS	NO: 21)	WMG	NO: 20)	RSMSTAYMELSSLR AEDTAVYYC	NO: 43)		NO: 15)
Ab344	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVITITRD RSTSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 44)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab345	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVITITRD RSTSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 45)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab346	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVITITRD RSMSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 46)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab347	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSTSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 47)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab348	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSTSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 48)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab349	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSMSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 49)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab350	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVITITRD RSTSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 50)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab351	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSTSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 47)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab352	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSTSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 48)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab353	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSMSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 49)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab354	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVITITRD RSTSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 50)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab355	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSTSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 139)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab356	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSTSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 139)	WGQGTTVTVSS	(SEQ ID NO: 15)
Ab357	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVITITRD RSMSTAYMELSSLR SEDAMYYC	(SEQ ID NO: 14)	WGQGTTLVTVSS	(SEQ ID NO: 19)
Ab358	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSMSTAYMELSSLR SEDAMYYC	(SEQ ID NO: 22)	WGQGTTLVTVSS	(SEQ ID NO: 19)
Ab359	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVITITRD RSTSTAYMELSSLR SEDAMYYC	(SEQ ID NO: 23)	WGQGTTLVTVSS	(SEQ ID NO: 19)
Ab360	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVITITRD RSMSTAYMELRSLR SEDAMYYC	(SEQ ID NO: 24)	WGQGTTLVTVSS	(SEQ ID NO: 19)
Ab361	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVITITRD RSMSTAYMELSSLR SEDAMYYC	(SEQ ID NO: 25)	WGQGTTLVTVSS	(SEQ ID NO: 19)

Ab362	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSMSTAYMELSSLR SEDTAMYCC	(SEQ ID NO: 22)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab363	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVITITRD RSTSTAYMELSSLR SEDTAMYCC	(SEQ ID NO: 23)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab364	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVITITRD RSMSTAYMELRSLR SEDTAMYCC	(SEQ ID NO: 24)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab365	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVITITRD RSMSTAYMELSSLR SEDTAVYYC	(SEQ ID NO: 25)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab366	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSTSTAYMELSSLR SEDTAMYCC	(SEQ ID NO: 26)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab367	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSMSTAYMELRSLR SEDTAMYCC	(SEQ ID NO: 27)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab368	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSMSTAYMELSSLR SEDTAVYYC	(SEQ ID NO: 28)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab369	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVITITRD RSTSTAYMELRSLR SEDTAMYCC	(SEQ ID NO: 29)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab370	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVITITRD RSTSTAYMELSSLR SEDTAVYYC	(SEQ ID NO: 30)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab371	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVITITRD RSMSTAYMELRSLR SEDTAVYYC	(SEQ ID NO: 31)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab372	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSTSTAYMELSSLR SEDTAMYCC	(SEQ ID NO: 26)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab373	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSMSTAYMELRSLR SEDTAMYCC	(SEQ ID NO: 27)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab374	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSMSTAYMELSSLR SEDTAVYYC	(SEQ ID NO: 28)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab375	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVITITRD RSTSTAYMELRSLR SEDTAMYCC	(SEQ ID NO: 29)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab376	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVITITRD RSTSTAYMELSSLR SEDTAVYYC	(SEQ ID NO: 30)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab377	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVITITRD RSMSTAYMELRSLR SEDTAVYYC	(SEQ ID NO: 31)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab378	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSTSTAYMELRSLR SEDTAMYCC	(SEQ ID NO: 32)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab379	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSTSTAYMELSSLR SEDTAVYYC	(SEQ ID NO: 33)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab380	X _{H1} QMQLVQSG AEVKKTGSSV	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSMSTAYMELRSLR	(SEQ ID NO: 34)	WGQGLVTVSS	(SEQ ID NO: 19)

	KVSCAS				SEDTAVYYC			
Ab381	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVITITRD RSTSTAYMELRSLR SEDTAVYYC	(SEQ ID NO: 35)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab382	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSTSTAYMELRSLR SEDTAMYCC	(SEQ ID NO: 32)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab383	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSTSTAYMELSSLR SEDTAVYYC	(SEQ ID NO: 33)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab384	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSMSTAYMELRSLR SEDTAVYYC	(SEQ ID NO: 34)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab385	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVITITRD RSTSTAYMELRSLR SEDTAVYYC	(SEQ ID NO: 35)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab386	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSTSTAYMELRSLR SEDTAVYYC	(SEQ ID NO: 36)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab387	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSTSTAYMELRSLR SEDTAVYYC	(SEQ ID NO: 36)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab388	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVITITRD RSMSTAYMELSSLR AEDTAMYCC	(SEQ ID NO: 18)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab389	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSMSTAYMELSSLR AEDTAMYCC	(SEQ ID NO: 37)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab390	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVITITRD RSTSTAYMELSSLR AEDTAMYCC	(SEQ ID NO: 38)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab391	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVITITRD RSMSTAYMELRSLR AEDTAMYCC	(SEQ ID NO: 39)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab392	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVITITRD RSMSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 40)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab393	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSMSTAYMELSSLR AEDTAMYCC	(SEQ ID NO: 37)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab394	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVITITRD RSTSTAYMELSSLR AEDTAMYCC	(SEQ ID NO: 38)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab395	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVITITRD RSMSTAYMELRSLR AEDTAMYCC	(SEQ ID NO: 39)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab396	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVITITRD RSMSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 40)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab397	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSTSTAYMELSSLR AEDTAMYCC	(SEQ ID NO: 41)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab398	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSMSTAYMELRSLR AEDTAMYCC	(SEQ ID NO: 42)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab399	X _{H1} QMQLVQSG	(SEQ ID	WVRQAPGKALE	(SEQ ID	YAQKFQGRVTITRD	(SEQ ID	WGQGLTVTVSS	(SEQ ID

	AEVKKTGSSV KVSCAS	NO: 12)	WMG	NO: 13)	RSMSTAYMELSSLR AEDTAVYYC	NO: 43)		NO: 19)
Ab400	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVITITRD RSTSTAYMELRSLR AEDTAMYYC	(SEQ ID NO: 44)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab401	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVITITRD RSTSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 45)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab402	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVITITRD RSMSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 46)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab403	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSTSTAYMELSSLR AEDTAMYYC	(SEQ ID NO: 41)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab404	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSMSTAYMELRSLR AEDTAMYYC	(SEQ ID NO: 42)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab405	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSMSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 43)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab406	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVITITRD RSTSTAYMELRSLR AEDTAMYYC	(SEQ ID NO: 44)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab407	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVITITRD RSTSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 45)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab408	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVITITRD RSMSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 46)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab409	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSTSTAYMELRSLR AEDTAMYYC	(SEQ ID NO: 47)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab410	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSTSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 48)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab411	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSMSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 49)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab412	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVITITRD RSTSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 50)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab413	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSTSTAYMELRSLR AEDTAMYYC	(SEQ ID NO: 47)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab414	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSTSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 48)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab415	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSMSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 49)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab416	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQDRVITITRD RSTSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 50)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab417	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSTSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 139)	WGQGLTVTVSS	(SEQ ID NO: 19)

Ab418	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKALE WMG	(SEQ ID NO: 13)	YAQKFQGRVTITRD RSTSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 139)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab419	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVITITRD RSMSTAYMELSSLR AEDTAMYYC	(SEQ ID NO: 18)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab420	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSMSTAYMELSSLR AEDTAMYYC	(SEQ ID NO: 37)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab421	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVITITRD RSTSTAYMELSSLR AEDTAMYYC	(SEQ ID NO: 38)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab422	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVITITRD RSMSTAYMELRSLR AEDTAMYYC	(SEQ ID NO: 39)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab423	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVITITRD RSMSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 40)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab424	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSMSTAYMELSSLR AEDTAMYYC	(SEQ ID NO: 37)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab425	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVITITRD RSTSTAYMELSSLR AEDTAMYYC	(SEQ ID NO: 38)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab426	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVITITRD RSMSTAYMELRSLR AEDTAMYYC	(SEQ ID NO: 39)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab427	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVITITRD RSMSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 40)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab428	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSTSTAYMELSSLR AEDTAMYYC	(SEQ ID NO: 41)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab429	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSMSTAYMELRSLR AEDTAMYYC	(SEQ ID NO: 42)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab430	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSMSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 43)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab431	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVITITRD RSTSTAYMELRSLR AEDTAMYYC	(SEQ ID NO: 44)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab432	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVITITRD RSTSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 45)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab433	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSMSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 46)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab434	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSTSTAYMELSSLR AEDTAMYYC	(SEQ ID NO: 41)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab435	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSMSTAYMELRSLR AEDTAMYYC	(SEQ ID NO: 42)	WGQGLVTVSS	(SEQ ID NO: 19)
Ab436	X _{H1} QMQLVQSG AEVKKPGSSV	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSMSTAYMELSSLR	(SEQ ID NO: 43)	WGQGLVTVSS	(SEQ ID NO: 19)

	KVSCAS				AEDTAVYYC			
Ab437	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVITITRD RSTSTAYMELRSLR AEDTAMYYC	(SEQ ID NO: 44)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab438	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVITITRD RSTSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 45)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab439	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVITITRD RSMSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 46)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab440	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSTSTAYMELRSLR AEDTAMYYC	(SEQ ID NO: 47)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab441	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSTSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 48)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab442	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSMSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 49)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab443	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVITITRD RSTSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 50)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab444	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSTSTAYMELRSLR AEDTAMYYC	(SEQ ID NO: 47)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab445	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSTSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 48)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab446	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSMSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 49)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab447	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQDRVITITRD RSTSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 50)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab448	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSTSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 139)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab449	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGQGLE WMG	(SEQ ID NO: 16)	YAQKFQGRVTITRD RSTSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 139)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab450	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVITITRD RSMSTAYMELSSLR AEDTAMYYC	(SEQ ID NO: 18)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab451	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSMSTAYMELSSLR AEDTAMYYC	(SEQ ID NO: 37)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab452	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVITITRD RSTSTAYMELSSLR AEDTAMYYC	(SEQ ID NO: 38)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab453	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVITITRD RSMSTAYMELRSLR AEDTAMYYC	(SEQ ID NO: 39)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab454	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVITITRD RSMSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 40)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab455	X _{H1} QMQLVQSG	(SEQ ID	WVRQAPGKGLE	(SEQ ID	YAQKFQGRVTITRD	(SEQ ID	WGQGLTVTVSS	(SEQ ID

	AEVKKPGSSV KVCKAS	NO: 21)	WMG	NO: 20)	RSMSTAYMELSSLR AEDTAMYYC	NO: 37)		NO: 19)
Ab456	X _{H1} QMQLVQSG AEVKKPGSSV KVCKAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVITITRD RSTSTAYMELSSLR AEDTAMYYC	(SEQ ID NO: 38)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab457	X _{H1} QMQLVQSG AEVKKPGSSV KVCKAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVITITRD RSMSTAYMELRSLR AEDTAMYYC	(SEQ ID NO: 39)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab458	X _{H1} QMQLVQSG AEVKKPGSSV KVCKAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVITITRD RSMSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 40)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab459	X _{H1} QMQLVQSG AEVKKTGSSV KVCKAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSTSTAYMELSSLR AEDTAMYYC	(SEQ ID NO: 41)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab460	X _{H1} QMQLVQSG AEVKKTGSSV KVCKAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSMSTAYMELRSLR AEDTAMYYC	(SEQ ID NO: 42)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab461	X _{H1} QMQLVQSG AEVKKTGSSV KVCKAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSMSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 43)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab462	X _{H1} QMQLVQSG AEVKKTGSSV KVCKAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVITITRD RSTSTAYMELRSLR AEDTAMYYC	(SEQ ID NO: 44)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab463	X _{H1} QMQLVQSG AEVKKTGSSV KVCKAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVITITRD RSTSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 45)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab464	X _{H1} QMQLVQSG AEVKKTGSSV KVCKAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVITITRD RSMSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 46)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab465	X _{H1} QMQLVQSG AEVKKPGSSV KVCKAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSTSTAYMELSSLR AEDTAMYYC	(SEQ ID NO: 41)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab466	X _{H1} QMQLVQSG AEVKKPGSSV KVCKAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSMSTAYMELRSLR AEDTAMYYC	(SEQ ID NO: 42)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab467	X _{H1} QMQLVQSG AEVKKPGSSV KVCKAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSMSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 43)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab468	X _{H1} QMQLVQSG AEVKKPGSSV KVCKAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVITITRD RSTSTAYMELRSLR AEDTAMYYC	(SEQ ID NO: 44)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab469	X _{H1} QMQLVQSG AEVKKPGSSV KVCKAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVITITRD RSTSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 45)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab470	X _{H1} QMQLVQSG AEVKKPGSSV KVCKAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVITITRD RSMSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 46)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab471	X _{H1} QMQLVQSG AEVKKTGSSV KVCKAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSTSTAYMELRSLR AEDTAMYYC	(SEQ ID NO: 47)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab472	X _{H1} QMQLVQSG AEVKKTGSSV KVCKAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSTSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 48)	WGQGLTVTVSS	(SEQ ID NO: 19)
Ab473	X _{H1} QMQLVQSG AEVKKTGSSV KVCKAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSMSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 49)	WGQGLTVTVSS	(SEQ ID NO: 19)

Ab474	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVITITRD RSTSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 50)	WGQGTLLVTVSS	(SEQ ID NO: 19)
Ab475	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSTSTAYMELRSLR AEDTAMYYC	(SEQ ID NO: 47)	WGQGTLLVTVSS	(SEQ ID NO: 19)
Ab476	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSTSTAYMELSSLR AEDTAVYYC	(SEQ ID NO: 48)	WGQGTLLVTVSS	(SEQ ID NO: 19)
Ab477	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSMSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 49)	WGQGTLLVTVSS	(SEQ ID NO: 19)
Ab478	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQDRVITITRD RSTSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 50)	WGQGTLLVTVSS	(SEQ ID NO: 19)
Ab479	X _{H1} QMQLVQSG AEVKKTGSSV KVSCAS	(SEQ ID NO: 12)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSTSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 139)	WGQGTLLVTVSS	(SEQ ID NO: 19)
Ab480	X _{H1} QMQLVQSG AEVKKPGSSV KVSCAS	(SEQ ID NO: 21)	WVRQAPGKGLE WMG	(SEQ ID NO: 20)	YAQKFQGRVTITRD RSTSTAYMELRSLR AEDTAVYYC	(SEQ ID NO: 139)	WGQGTLLVTVSS	(SEQ ID NO: 19)

[00153] In another aspect, provided herein is an antibody or an antigen-binding fragment thereof, comprising a heavy chain variable region (VH) that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1, VH FR2, VH FR3 and VH FR4 comprise the amino acid sequence of X_{H32}QX_{H33}TLX_{H34}ESGPX_{H35}LVKPTX_{H36}TLTLTCTX_{H37}S (SEQ ID NO: 86); WIRQPPGKX_{H73}LEWLA (SEQ ID NO: 87); YSX_{H38}SLKX_{H39}RLTX_{H40}X_{H41}X_{H42}DTSX_{H43}X_{H44}QVVLTMX_{H45}NMDX_{H46}X_{H47}DTAX_{H48}YYC (SEQ ID NO: 88); WGXX_{H49}GTX_{H50}VTVSS (SEQ ID NO: 89), respectively, wherein X_{H32} is M or no amino acid, X_{H33} is V or I, X_{H34} is K or R, X_{H35} is V, T or A, X_{H36} is E, Q, or A, X_{H37} is V or F, X_{H73} is A or G, X_{H38} is T or P, X_{H39} is S, T, or G, X_{H40} is I or M, X_{H41} is S or T, X_{H42} is K or T, X_{H43} is K or T, X_{H44} is N or S, X_{H45} is T or R, X_{H46} is P or A, X_{H47} is V or D, X_{H48} is T or V, X_{H49} is Q or R, and X_{H50} is L, M or T, and wherein at least one of the following is satisfied: X_{H73} is G, and X_{H46} is A. In certain embodiments, X_{H73} is G and X_{H46} is A.

[00154] In certain embodiments of the preceding aspect, at least one of the following is satisfied: X_{H33} is V, X_{H36} is A, X_{H39} is G, X_{H40} is M, X_{H42} is T, X_{H43} is T, X_{H45} is R, X_{H47} is D, X_{H48} is V, and X_{H50} is L. In certain embodiments, at least two of the following are satisfied: X_{H33} is V, X_{H36} is A, X_{H39} is G, X_{H40} is M, X_{H42} is T, X_{H43} is T, X_{H45} is R, X_{H47} is D, X_{H48} is V,

and X_{H50} is L. In certain embodiments, at least three of the following are satisfied: X_{H33} is V, X_{H36} is A, X_{H39} is G, X_{H40} is M, X_{H42} is T, X_{H43} is T, X_{H45} is R, X_{H47} is D, X_{H48} is V, and X_{H50} is L. In certain embodiments, at least four of the following are satisfied: X_{H33} is V, X_{H36} is A, X_{H39} is G, X_{H40} is M, X_{H42} is T, X_{H43} is T, X_{H45} is R, X_{H47} is D, X_{H48} is V, and X_{H50} is L. In certain embodiments, at least five of the following are satisfied: X_{H33} is V, X_{H36} is A, X_{H39} is G, X_{H40} is M, X_{H42} is T, X_{H43} is T, X_{H45} is R, X_{H47} is D, X_{H48} is V, and X_{H50} is L. In certain embodiments, at least six of the following are satisfied: X_{H33} is V, X_{H36} is A, X_{H39} is G, X_{H40} is M, X_{H42} is T, X_{H43} is T, X_{H45} is R, X_{H47} is D, X_{H48} is V, and X_{H50} is L. In certain embodiments, at least seven of the following are satisfied: X_{H33} is V, X_{H36} is A, X_{H39} is G, X_{H40} is M, X_{H42} is T, X_{H43} is T, X_{H45} is R, X_{H47} is D, X_{H48} is V, and X_{H50} is L. In certain embodiments, at least eight of the following are satisfied: X_{H33} is V, X_{H36} is A, X_{H39} is G, X_{H40} is M, X_{H42} is T, X_{H43} is T, X_{H45} is R, X_{H47} is D, X_{H48} is V, and X_{H50} is L. In certain embodiments, at least nine of the following are satisfied: X_{H33} is V, X_{H36} is A, X_{H39} is G, X_{H40} is M, X_{H42} is T, X_{H43} is T, X_{H45} is R, X_{H47} is D, X_{H48} is V, and X_{H50} is L. In certain embodiments, X_{H33} is V, X_{H36} is A, X_{H39} is G, X_{H40} is M, X_{H42} is T, X_{H43} is T, X_{H45} is R, X_{H47} is D, X_{H48} is V, and X_{H50} is L.

[00155] In certain embodiments of the preceding aspect, at least one of the following is satisfied: X_{H39} is G, X_{H43} is T, X_{H45} is R, X_{H48} is V, and X_{H50} is L. In certain embodiments, at least two of the following are satisfied: X_{H39} is G, X_{H43} is T, X_{H45} is R, X_{H48} is V, and X_{H50} is L. In certain embodiments, at least three of the following are satisfied: X_{H39} is G, X_{H43} is T, X_{H45} is R, X_{H48} is V, and X_{H50} is L. In certain embodiments, at least four of the following are satisfied: X_{H39} is G, X_{H43} is T, X_{H45} is R, X_{H48} is V, and X_{H50} is L. In certain embodiments, X_{H39} is G, X_{H43} is T, X_{H45} is R, X_{H48} is V, and X_{H50} is L.

[00156] In certain embodiments of the preceding aspect, X_{H50} is L.

[00157] In a specific embodiment of the certain embodiments wherein X_{H50} is L, at least one of the following is further satisfied: X_{H39} is G, X_{H43} is T, X_{H45} is R, and X_{H48} is V. In another specific embodiment of the certain embodiments wherein X_{H50} is L, at least two of the following are further satisfied: X_{H39} is G, X_{H43} is T, X_{H45} is R, and X_{H48} is V. In another specific embodiment of the certain embodiments wherein X_{H50} is L, at least three of the following are further satisfied: X_{H39} is G, X_{H43} is T, X_{H45} is R, and X_{H48} is V. In another specific embodiment of the certain embodiments wherein X_{H50} is L, the following is further satisfied: X_{H39} is G, X_{H43} is T, X_{H45} is R, and X_{H48} is V.

[00158] In a further specific embodiment wherein X_{H50} is L, and wherein at least one, two, three, or all of the following are satisfied: X_{H39} is G, X_{H43} is T, X_{H45} is R, and X_{H48} is V, at least one of the following is further satisfied: X_{H33} is V, X_{H36} is A, X_{H40} is M, X_{H42} is T, X_{H47} is D. In another further specific embodiment wherein X_{H50} is L, and wherein at least one, two, three, or all of the following are satisfied: X_{H39} is G, X_{H43} is T, X_{H45} is R, and X_{H48} is V, at least two of the following are further satisfied: X_{H33} is V, X_{H36} is A, X_{H40} is M, X_{H42} is T, X_{H47} is D. In another further specific embodiment wherein X_{H50} is L, and wherein at least one, two, three, or all of the following are satisfied: X_{H39} is G, X_{H43} is T, X_{H45} is R, and X_{H48} is V, at least three of the following are further satisfied: X_{H33} is V, X_{H36} is A, X_{H40} is M, X_{H42} is T, X_{H47} is D. In another further specific embodiment wherein X_{H50} is L, and wherein at least one, two, three, or all of the following are satisfied: X_{H39} is G, X_{H43} is T, X_{H45} is R, and X_{H48} is V, at least four of the following are further satisfied: X_{H33} is V, X_{H36} is A, X_{H40} is M, X_{H42} is T, X_{H47} is D. In another further specific embodiment wherein X_{H50} is L, and wherein at least one, two, three, or all of the following are satisfied: X_{H39} is G, X_{H43} is T, X_{H45} is R, and X_{H48} is V, the following is further satisfied: X_{H33} is V, X_{H36} is A, X_{H40} is M, X_{H42} is T, X_{H47} is D.

[00159] In a specific embodiment of the certain embodiments wherein X_{H50} is L, at least one of the following is further satisfied: X_{H33} is V, X_{H36} is A, X_{H39} is G, X_{H40} is M, X_{H42} is T, X_{H43} is T, X_{H45} is R, X_{H47} is D, and X_{H48} is V. In another specific embodiment of the certain embodiments wherein X_{H50} is L, at least two of the following are further satisfied: X_{H33} is V, X_{H36} is A, X_{H39} is G, X_{H40} is M, X_{H42} is T, X_{H43} is T, X_{H45} is R, X_{H47} is D, and X_{H48} is V. In another specific embodiment of the certain embodiments wherein X_{H50} is L, at least three of the following are further satisfied: X_{H33} is V, X_{H36} is A, X_{H39} is G, X_{H40} is M, X_{H42} is T, X_{H43} is T, X_{H45} is R, X_{H47} is D, and X_{H48} is V. In another specific embodiment of the certain embodiments wherein X_{H50} is L, at least four of the following are further satisfied: X_{H33} is V, X_{H36} is A, X_{H39} is G, X_{H40} is M, X_{H42} is T, X_{H43} is T, X_{H45} is R, X_{H47} is D, and X_{H48} is V. In another specific embodiment of the certain embodiments wherein X_{H50} is L, at least five of the following are further satisfied: X_{H33} is V, X_{H36} is A, X_{H39} is G, X_{H40} is M, X_{H42} is T, X_{H43} is T, X_{H45} is R, X_{H47} is D, and X_{H48} is V. In another specific embodiment of the certain embodiments wherein X_{H50} is L, at least six of the following are further satisfied: X_{H33} is V, X_{H36} is A, X_{H39} is G, X_{H40} is M, X_{H42} is T, X_{H43} is T, X_{H45} is R, X_{H47} is D, and X_{H48} is V. In another specific embodiment of the certain embodiments wherein X_{H50} is L, at least seven of the following are further satisfied: X_{H33}

is V, X_{H36} is A, X_{H39} is G, X_{H40} is M, X_{H42} is T, X_{H43} is T, X_{H45} is R, X_{H47} is D, and X_{H48} is V. In another specific embodiment of the certain embodiments wherein X_{H50} is L, at least eight of the following are further satisfied: X_{H33} is V, X_{H36} is A, X_{H39} is G, X_{H40} is M, X_{H42} is T, X_{H43} is T, X_{H45} is R, X_{H47} is D, and X_{H48} is V. In another specific embodiment of the certain embodiments wherein X_{H50} is L, the following are further satisfied: X_{H33} is V, X_{H36} is A, X_{H39} is G, X_{H40} is M, X_{H42} is T, X_{H43} is T, X_{H45} is R, X_{H47} is D, and X_{H48} is V.

[00160] In specific embodiments of the preceding aspect, X_{H33} is V or I, X_{H36} is E or Q, X_{H40} is I, X_{H42} is K, and X_{H47} is V.

[00161] In another aspect, provided herein is an antibody or an antigen-binding fragment thereof, comprising a heavy chain variable region (VH) that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1, VH FR2, VH FR3 and VH FR4 comprise the amino acid sequence of X_{H71} QVQLQQSGPGLVKPS X_{H51} TL X_{H52} SLTCAIS (SEQ ID NO: 90);

WIRQSPS X_{H52} GLEWLG (SEQ ID NO: 91);

YAVS X_{H53} K X_{H54} RIT X_{H55} N X_{H56} DT X_{H57} NQFSLQL X_{H58} SVT X_{H74} X_{H59} DTAVYYC (SEQ ID NO: 92); WG X_{H60} GT X_{H61} VTVSS (SEQ ID NO: 93), respectively, wherein, X_{H71} is M or no amino acid, X_{H51} is Q or A, X_{H52} is R or K, X_{H53} is V or L, X_{H54} is S or G, X_{H55} is I or M, X_{H56} is P or T, X_{H57} is K or T, X_{H58} is N or R, X_{H74} is P or A, X_{H59} is E or D, X_{H60} is Q or R, and X_{H61} is L, M or T, and at least one of the following is satisfied: X_{H52} is K, and X_{H74} is A. In certain embodiments, X_{H52} is K and X_{H74} is A.

[00162] In certain embodiments of the preceding aspect, at least one of the following is satisfied: X_{H51} is A, X_{H53} is L, X_{H54} is G, X_{H55} is M, X_{H56} is T, X_{H57} is T, X_{H58} is R, X_{H59} is D, and X_{H61} is L. In certain embodiments, at least two of the following are satisfied: X_{H51} is A, X_{H53} is L, X_{H54} is G, X_{H55} is M, X_{H56} is T, X_{H57} is T, X_{H58} is R, X_{H59} is D, and X_{H61} is L. In certain embodiments, at least three of the following are satisfied: X_{H51} is A, X_{H53} is L, X_{H54} is G, X_{H55} is M, X_{H56} is T, X_{H57} is T, X_{H58} is R, X_{H59} is D, and X_{H61} is L. In certain embodiments, at least four of the following are satisfied: X_{H51} is A, X_{H53} is L, X_{H54} is G, X_{H55} is M, X_{H56} is T, X_{H57} is T, X_{H58} is R, X_{H59} is D, and X_{H61} is L. In certain embodiments, at least five of the following are satisfied: X_{H51} is A, X_{H53} is L, X_{H54} is G, X_{H55} is M, X_{H56} is T, X_{H57} is T, X_{H58} is R, X_{H59} is D, and X_{H61} is L. In certain embodiments, at least six of the following are satisfied: X_{H51}

is A, X_{H53} is L, X_{H54} is G, X_{H55} is M, X_{H56} is T, X_{H57} is T, X_{H58} is R, X_{H59} is D, and X_{H61} is L. In certain embodiments, at least seven of the following are satisfied: X_{H51} is A, X_{H53} is L, X_{H54} is G, X_{H55} is M, X_{H56} is T, X_{H57} is T, X_{H58} is R, X_{H59} is D, and X_{H61} is L. In certain embodiments, at least eight of the following are satisfied: X_{H51} is A, X_{H53} is L, X_{H54} is G, X_{H55} is M, X_{H56} is T, X_{H57} is T, X_{H58} is R, X_{H59} is D, and X_{H61} is L. In certain embodiments, X_{H51} is A, X_{H53} is L, X_{H54} is G, X_{H55} is M, X_{H56} is T, X_{H57} is T, X_{H58} is R, X_{H59} is D, and X_{H61} is L.

[00163] In certain embodiments of the preceding aspect, at least one of the following is satisfied: X_{H54} is G, X_{H57} is T, X_{H58} is R, and X_{H61} is L. In certain embodiments, at least two of the following are satisfied: X_{H54} is G, X_{H57} is T, X_{H58} is R, and X_{H61} is L. In certain embodiments, at least three of the following are satisfied: X_{H54} is G, X_{H57} is T, X_{H58} is R, and X_{H61} is L. In certain embodiments, X_{H54} is G, X_{H57} is T, X_{H58} is R, and X_{H61} is L.

[00164] In certain embodiments of the preceding aspect, X_{H61} is L.

[00165] In a specific embodiment of the certain embodiments wherein X_{H61} is L, at least one of the following is further satisfied: X_{H54} is G, X_{H57} is T, and X_{H58} is R. In another specific embodiment of the certain embodiments wherein X_{H61} is L, at least two of the following are further satisfied: X_{H54} is G, X_{H57} is T, and X_{H58} is R. In another specific embodiment of the certain embodiments wherein X_{H61} is L, the following is further satisfied: X_{H54} is G, X_{H57} is T, and X_{H58} is R.

[00166] In a further specific embodiment wherein X_{H61} is L, and wherein at least one, two, or all of the following are further satisfied: X_{H54} is G, X_{H57} is T, and X_{H58} is R, at least one of the following is further satisfied: X_{H51} is A, X_{H53} is L, X_{H55} is M, X_{H56} is T, and X_{H59} is D. In another further specific embodiment wherein X_{H61} is L, and wherein at least one, two, or all of the following are further satisfied: X_{H54} is G, X_{H57} is T, and X_{H58} is R, at least two of the following are further satisfied: X_{H51} is A, X_{H53} is L, X_{H55} is M, X_{H56} is T, and X_{H59} is D. In another further specific embodiment wherein X_{H61} is L, and wherein at least one, two, or all of the following are further satisfied: X_{H54} is G, X_{H57} is T, and X_{H58} is R, at least three of the following are further satisfied: X_{H51} is A, X_{H53} is L, X_{H55} is M, X_{H56} is T, and X_{H59} is D. In another further specific embodiment wherein X_{H61} is L, and wherein at least one, two, or all of the following are further satisfied: X_{H54} is G, X_{H57} is T, and X_{H58} is R, at least four of the following are further satisfied: X_{H51} is A, X_{H53} is L, X_{H55} is M, X_{H56} is T, and X_{H59} is D. In another further specific embodiment wherein X_{H61} is L, and wherein at least one, two, or all of

the following are further satisfied: X_{H54} is G, X_{H57} is T, and X_{H58} is R, the following is further satisfied: X_{H51} is A, X_{H53} is L, X_{H55} is M, X_{H56} is T, and X_{H59} is D.

[00167] In a specific embodiment of the certain embodiments wherein X_{H61} is L, at least one of the following is further satisfied: X_{H51} is A, X_{H53} is L, X_{H54} is G, X_{H55} is M, X_{H56} is T, X_{H57} is T, X_{H58} is R, and X_{H59} is D. In another specific embodiment of the certain embodiments wherein X_{H61} is L, at least two of the following are further satisfied: X_{H51} is A, X_{H53} is L, X_{H54} is G, X_{H55} is M, X_{H56} is T, X_{H57} is T, X_{H58} is R, and X_{H59} is D. In another specific embodiment of the certain embodiments wherein X_{H61} is L, at least three of the following are further satisfied: X_{H51} is A, X_{H53} is L, X_{H54} is G, X_{H55} is M, X_{H56} is T, X_{H57} is T, X_{H58} is R, and X_{H59} is D. In another specific embodiment of the certain embodiments wherein X_{H61} is L, at least four of the following are further satisfied: X_{H51} is A, X_{H53} is L, X_{H54} is G, X_{H55} is M, X_{H56} is T, X_{H57} is T, X_{H58} is R, and X_{H59} is D. In another specific embodiment of the certain embodiments wherein X_{H61} is L, at least five of the following are further satisfied: X_{H51} is A, X_{H53} is L, X_{H54} is G, X_{H55} is M, X_{H56} is T, X_{H57} is T, X_{H58} is R, and X_{H59} is D. In another specific embodiment of the certain embodiments wherein X_{H61} is L, at least six of the following are further satisfied: X_{H51} is A, X_{H53} is L, X_{H54} is G, X_{H55} is M, X_{H56} is T, X_{H57} is T, X_{H58} is R, and X_{H59} is D. In another specific embodiment of the certain embodiments wherein X_{H61} is L, at least seven of the following are further satisfied: X_{H51} is A, X_{H53} is L, X_{H54} is G, X_{H55} is M, X_{H56} is T, X_{H57} is T, X_{H58} is R, and X_{H59} is D. In another specific embodiment of the certain embodiments wherein X_{H61} is L, the following is further satisfied: X_{H51} is A, X_{H53} is L, X_{H54} is G, X_{H55} is M, X_{H56} is T, X_{H57} is T, X_{H58} is R, and X_{H59} is D.

[00168] In specific embodiments of the preceding aspect, X_{H51} is Q, X_{H53} is V, X_{H55} is I, X_{H56} is P, and X_{H59} is E.

[00169] In another aspect, provided herein is an antibody or an antigen-binding fragment thereof, comprising a heavy chain variable region (VH) that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1, VH FR2, VH FR3 and VH FR4 comprise the amino acid sequence of X_{H72} QVQLVQSGSELKKPGASVKVCKAS (SEQ ID NO: 94);
WVRQAPGKGLEWMG (SEQ ID NO: 95);
YAQG X_{H63} TGRFV X_{H64} S X_{H65} DTS X_{H66} STAYLQIX X_{H67} SLKAX X_{H68} DTAVYYC (SEQ ID NO:

96); WGX_{H69}GTX_{H70}VTVSS (SEQ ID NO: 97), respectively wherein X_{H72} is M or no amino acid, X_{H63} is L or F, X_{H64} is M or F, X_{H65} is L or T, X_{H66} is V or T, X_{H67} is R or C, X_{H68} is D or E, X_{H69} is Q or R, and X_{H70} is L, M or T.

[00170] In certain embodiments of the preceding aspect, at least one of the following is satisfied: X_{H63} is L, X_{H64} is M, X_{H65} is T, X_{H66} is T, X_{H67} is R, X_{H68} is D, and X_{H70} is L. In certain embodiments, at least two of the following are satisfied: X_{H63} is L, X_{H64} is M, X_{H65} is T, X_{H66} is T, X_{H67} is R, X_{H68} is D, and X_{H70} is L. In certain embodiments, at least three of the following are satisfied: X_{H63} is L, X_{H64} is M, X_{H65} is T, X_{H66} is T, X_{H67} is R, X_{H68} is D, and X_{H70} is L. In certain embodiments, at least four of the following are satisfied: X_{H63} is L, X_{H64} is M, X_{H65} is T, X_{H66} is T, X_{H67} is R, X_{H68} is D, and X_{H70} is L. In certain embodiments, at least five of the following are satisfied: X_{H63} is L, X_{H64} is M, X_{H65} is T, X_{H66} is T, X_{H67} is R, X_{H68} is D, and X_{H70} is L. In certain embodiments, at least six of the following are satisfied: X_{H63} is L, X_{H64} is M, X_{H65} is T, X_{H66} is T, X_{H67} is R, X_{H68} is D, and X_{H70} is L. In certain embodiments, X_{H63} is L, X_{H64} is M, X_{H65} is T, X_{H66} is T, X_{H67} is R, X_{H68} is D, and X_{H70} is L.

[00171] In certain embodiments of the preceding aspect, at least one of the following is satisfied: X_{H66} is T, X_{H67} is R, and X_{H70} is L. In certain embodiments, at least two of the following are satisfied: X_{H66} is T, X_{H67} is R, and X_{H70} is L. In certain embodiments, X_{H66} is T, X_{H67} is R, and X_{H70} is L.

[00172] In certain embodiments of the preceding aspect, X_{H70} is L.

[00173] In a specific embodiment of the certain embodiments wherein X_{H70} is L, at least one of the following is further satisfied: X_{H66} is T, and X_{H67} is R. In another specific embodiment of the certain embodiments wherein X_{H70} is L, the following is further satisfied: X_{H66} is T, and X_{H67} is R.

[00174] In a further specific embodiment wherein X_{H70} is L, and wherein at least one or both of the following are further satisfied: X_{H66} is T, and X_{H67} is R, at least one of the following is further satisfied: X_{H63} is L, X_{H64} is M, X_{H65} is T, and X_{H68} is D. In another further specific embodiment wherein X_{H70} is L, and wherein at least one or both of the following are further satisfied: X_{H66} is T, and X_{H67} is R, at least two of the following are further satisfied: X_{H63} is L, X_{H64} is M, X_{H65} is T, and X_{H68} is D. In another further specific embodiment wherein X_{H70} is L, and wherein at least one or both of the following are further satisfied: X_{H66} is T, and X_{H67} is R, at least three of the following are further satisfied: X_{H63} is L, X_{H64} is M, X_{H65} is T, and X_{H68} is D.

In another further specific embodiment wherein X_{H70} is L, and wherein at least one or both of the following are further satisfied: X_{H66} is T, and X_{H67} is R, the following are further satisfied: X_{H63} is L, X_{H64} is M, X_{H65} is T, and X_{H68} is D.

[00175] In a specific embodiment wherein X_{H70} is L, at least one of the following is further satisfied: X_{H63} is L, X_{H64} is M, X_{H65} is T, X_{H66} is T, and X_{H67} is R, and X_{H68} is D. In another specific embodiment wherein X_{H70} is L, at least two of the following are further satisfied: X_{H63} is L, X_{H64} is M, X_{H65} is T, X_{H66} is T, and X_{H67} is R, and X_{H68} is D. In another specific embodiment wherein X_{H70} is L, at least three of the following are further satisfied: X_{H63} is L, X_{H64} is M, X_{H65} is T, X_{H66} is T, and X_{H67} is R, and X_{H68} is D. In another specific embodiment wherein X_{H70} is L, at least four of the following are further satisfied: X_{H63} is L, X_{H64} is M, X_{H65} is T, X_{H66} is T, and X_{H67} is R, and X_{H68} is D. In another specific embodiment wherein X_{H70} is L, at least five of the following are further satisfied: X_{H63} is L, X_{H64} is M, X_{H65} is T, X_{H66} is T, and X_{H67} is R, and X_{H68} is D. In another specific embodiment wherein X_{H70} is L, the following are further satisfied: X_{H63} is L, X_{H64} is M, X_{H65} is T, X_{H66} is T, and X_{H67} is R, and X_{H68} is D.

[00176] In specific embodiments of the preceding aspect, X_{H63} is F, X_{H64} is F, X_{H65} is L, and X_{H68} is E.

[00177] In another aspect, provided herein is an antibody or antigen-binding fragment thereof comprising a VH described in Section 5.1.1, and further comprising a VL.

[00178] In another aspect, provided herein is an antibody or antigen-binding fragment thereof comprising a VH described in Section 5.1.1, and further comprising a VL described in Section 5.1.2.

[00179] In another aspect, provided herein is an antibody or antigen-binding fragment thereof which specifically binds to CD47 and comprises a VH described in Section 5.1.1, wherein the VH CDRs are as described in Section 5.1.3.

[00180] In another aspect, provided herein is an antibody or antigen-binding fragment thereof which specifically binds to CD47 and comprises a VH described in Section 5.1.1 and a VL described in Section 5.1.2, wherein the VH CDRs are as described in Section 5.1.3.

[00181] In another aspect, provided herein is an antibody or antigen-binding fragment thereof which specifically binds to CD47 and comprises a VH described in Section 5.1.1 and a VL described in Section 5.1.2, wherein the VL CDRs are as described in Section 5.1.3.

[00182] In another aspect, provided herein is an antibody or antigen-binding fragment thereof which specifically binds to CD47 and comprises a VH described in Section 5.1.1 and a VL described in Section 5.1.2, wherein the VH CDRs are as described in Section 5.1.3, and the VL CDRs are as described in Section 5.1.3.

[00183] In any of the aspects and embodiments described above, the amino acid sequence of the VH FR3 can also comprise the additional residues of NA at the C-terminus.

[00184] In any of the aspects and embodiments described above, the amino acid sequence of the corresponding VH FR3 can be shorter by four, five, six or seven residues at the N-terminus relative to the VH FR3 sequence described above.

[00185] In certain embodiments, the VH FR sequences described herein are utilized with CDRs determined in accordance with the Kabat numbering system (that is, are Kabat CDRs). In such embodiments, the boundaries of such VH FR sequences described herein are also determined in accordance with the Kabat numbering system. In certain embodiments, the VH FR sequences described herein are utilized with CDRs determined in accordance with the Chothia numbering system (that is, are Chothia CDRs). In such embodiments, the boundaries of such VH FR sequences are also determined in accordance with the Chothia numbering system. In certain embodiments, the VH FR sequences described herein are utilized with CDRs determined in accordance with the IMGT numbering system. In such embodiments, the boundaries of such VH FR sequences are also determined in accordance with the IMGT numbering system. In certain embodiments, the VH FR sequences described herein are utilized with CDRs determined in accordance with the ABM numbering system. In such embodiments, the boundaries of such VH FR sequences are also determined in accordance with the ABM numbering system. Thus, provided herein are antibodies or antigen-binding fragments that comprise one or more of the VH FR sequences described above that are determined in accordance with the Kabat numbering scheme, the Chothia numbering scheme, the IMGT numbering system, or the ABM numbering system. As discussed herein, determination of CDRs in accordance with any of the Kabat, Chothia, IMGT, or ABM numbering systems is well known to those of skill in the art. As such, determination of boundaries of VH FR sequences described herein that can be utilized with such CDRs is also well known and routine to those of skill in the art.

5.1.2 Antibodies with specific light chain variable region framework region sequences

[00186] Provided herein are antibodies and antigen-binding fragments thereof comprising specific light chain variable region framework region (VL FR) sequences.

[00187] In one aspect, provided herein is an antibody or antigen-binding fragment thereof comprising a light chain variable region (VL) that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1, VL FR2, VL FR3 and VL FR4 comprise the amino acid sequence of NIQMTQSPSX_{L1}X_{L2}SASVGDRVTITC (SEQ ID NO: 8);

WX_{L3}QQKPGKX_{L4}PKHLIY (SEQ ID NO: 9);

GVPSRFSGSGSGTEFTLTISSLQPEDFATYYC (SEQ ID NO: 10); and

FGGGTKVEIK (SEQ ID NO: 11), respectively,

wherein X_{L1} is A or S, X_{L2} is M or L, X_{L3} is F or Y, and X_{L4} is V or A.

[00188] In certain embodiments of the preceding aspect, at least one of the following is satisfied: X_{L1} is S, X_{L2} is L, X_{L3} is Y, and X_{L4} is A. In certain embodiments, at least two of the following are satisfied: X_{L1} is S, X_{L2} is L, X_{L3} is Y, and X_{L4} is A. In certain embodiments, at least three of the following are satisfied: X_{L1} is S, X_{L2} is L, X_{L3} is Y, and X_{L4} is A. In certain embodiments, X_{L1} is S, X_{L2} is L, X_{L3} is Y, and X_{L4} is A.

[00189] In a specific embodiment, provided herein is an antibody or antigen-binding fragment thereof of any listed in Table 2, which comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence listed in the second column of Table 2 for the antibody or antigen-binding fragment, VL FR2 comprises the amino acid sequence listed in the fourth column of Table 2 for the antibody or antigen-binding fragment, VL FR3 comprises the amino acid sequence listed in the sixth column of Table 2 for the antibody or antigen-binding fragment, and VL FR4 comprises the amino acid sequence listed in the eighth column of Table 2 for the antibody or antigen-binding fragment.

[00190] Table 2. Exemplary Antibodies with Specific VL FR sequences.

Anti -body	VL - FR1	SEQ ID NO:	VL - FR2	SEQ ID NO:	VL - FR3	SEQ ID NO:	VL - FR4	SEQ ID NO:
Ab481	NIQMTQSPSA MSASVGDRV TITC	(SEQ ID NO: 51)	WFQQKPGKV PKHLIY	(SEQ ID NO: 52)	GVPSRFSGSGS GTEFTLTISSLQ PEDFATYYC	(SEQ ID NO: 10)	FGGGTKVEIK	(SEQ ID NO: 11)
Ab482	NIQMTQSPSS MSASVGDRV TITC	(SEQ ID NO: 53)	WFQQKPGKV PKHLIY	(SEQ ID NO: 52)	GVPSRFSGSGS GTEFTLTISSLQ PEDFATYYC	(SEQ ID NO: 10)	FGGGTKVEIK	(SEQ ID NO: 11)
Ab483	NIQMTQSPSA LSASVGDRV TITC	(SEQ ID NO: 54)	WFQQKPGKV PKHLIY	(SEQ ID NO: 52)	GVPSRFSGSGS GTEFTLTISSLQ PEDFATYYC	(SEQ ID NO: 10)	FGGGTKVEIK	(SEQ ID NO: 11)
Ab484	NIQMTQSPSA MSASVGDRV TITC	(SEQ ID NO: 51)	WYQQKPGKV PKHLIY	(SEQ ID NO: 55)	GVPSRFSGSGS GTEFTLTISSLQ PEDFATYYC	(SEQ ID NO: 10)	FGGGTKVEIK	(SEQ ID NO: 11)
Ab485	NIQMTQSPSA MSASVGDRV TITC	(SEQ ID NO: 51)	WFQQKPGKA PKHLIY	(SEQ ID NO: 56)	GVPSRFSGSGS GTEFTLTISSLQ PEDFATYYC	(SEQ ID NO: 10)	FGGGTKVEIK	(SEQ ID NO: 11)
Ab486	NIQMTQSPSS LSASVGDRV TITC	(SEQ ID NO: 57)	WFQQKPGKV PKHLIY	(SEQ ID NO: 52)	GVPSRFSGSGS GTEFTLTISSLQ PEDFATYYC	(SEQ ID NO: 10)	FGGGTKVEIK	(SEQ ID NO: 11)
Ab487	NIQMTQSPSS MSASVGDRV TITC	(SEQ ID NO: 53)	WYQQKPGKV PKHLIY	(SEQ ID NO: 55)	GVPSRFSGSGS GTEFTLTISSLQ PEDFATYYC	(SEQ ID NO: 10)	FGGGTKVEIK	(SEQ ID NO: 11)
Ab488	NIQMTQSPSS MSASVGDRV TITC	(SEQ ID NO: 53)	WFQQKPGKA PKHLIY	(SEQ ID NO: 56)	GVPSRFSGSGS GTEFTLTISSLQ PEDFATYYC	(SEQ ID NO: 10)	FGGGTKVEIK	(SEQ ID NO: 11)
Ab489	NIQMTQSPSA LSASVGDRV TITC	(SEQ ID NO: 54)	WYQQKPGKV PKHLIY	(SEQ ID NO: 55)	GVPSRFSGSGS GTEFTLTISSLQ PEDFATYYC	(SEQ ID NO: 10)	FGGGTKVEIK	(SEQ ID NO: 11)
Ab490	NIQMTQSPSA LSASVGDRV TITC	(SEQ ID NO: 54)	WFQQKPGKA PKHLIY	(SEQ ID NO: 56)	GVPSRFSGSGS GTEFTLTISSLQ PEDFATYYC	(SEQ ID NO: 10)	FGGGTKVEIK	(SEQ ID NO: 11)
Ab491	NIQMTQSPSA MSASVGDRV TITC	(SEQ ID NO: 51)	WYQQKPGKA PKHLIY	(SEQ ID NO: 58)	GVPSRFSGSGS GTEFTLTISSLQ PEDFATYYC	(SEQ ID NO: 10)	FGGGTKVEIK	(SEQ ID NO: 11)
Ab492	NIQMTQSPSS LSASVGDRV	(SEQ ID NO: 57)	WYQQKPGKV PKHLIY	(SEQ ID NO: 55)	GVPSRFSGSGS GTEFTLTISSLQ	(SEQ ID NO: 10)	FGGGTKVEIK	(SEQ ID NO: 11)

	TITC				PEDFATYYC			
Ab493	NIQMTQSPSS				GVPSRFSGSGS			
	LSASVGDRV	(SEQ ID	WFQQKPGKA	(SEQ ID	GTEFTLTISLQ	(SEQ ID		(SEQ ID
	TITC	NO: 57)	PKHLIY	NO: 56)	PEDFATYYC	NO: 10)	FGGGTKVEIK	NO: 11)
Ab494	NIQMTQSPSA				GVPSRFSGSGS			
	LSASVGDRV	(SEQ ID	WYQQKPGKA	(SEQ ID	GTEFTLTISLQ	(SEQ ID		(SEQ ID
	TITC	NO: 54)	PKHLIY	NO: 58)	PEDFATYYC	NO: 10)	FGGGTKVEIK	NO: 11)
Ab495	NIQMTQSPSS				GVPSRFSGSGS			
	LSASVGDRV	(SEQ ID	WYQQKPGKA	(SEQ ID	GTEFTLTISLQ	(SEQ ID		(SEQ ID
	TITC	NO: 57)	PKHLIY	NO: 58)	PEDFATYYC	NO: 10)	FGGGTKVEIK	NO: 11)

[00191] In another aspect, provided herein is an antibody or antigen-binding fragment thereof which specifically binds to CD47 and comprises a VL described in Section 5.1.2, wherein the VL CDRs are as described in Section 5.1.3.

[00192] In certain embodiments, the VL FR sequences described herein are utilized with CDRs determined in accordance with the Kabat numbering system (that is, are Kabat CDRs). In such embodiments, the boundaries of such VL FR sequences described herein are also determined in accordance with the Kabat numbering system. In certain embodiments, the VL FR sequences described herein are utilized with CDRs determined in accordance with the Chothia numbering system (that is, are Chothia CDRs). In such embodiments, the boundaries of such VL FR sequences are also determined in accordance with the Chothia numbering system. In certain embodiments, the VL FR sequences described herein are utilized with CDRs determined in accordance with the IMGT numbering system. In such embodiments, the boundaries of such VL FR sequences are also determined in accordance with the IMGT numbering system. In certain embodiments, the VL FR sequences described herein are utilized with CDRs determined in accordance with the ABM numbering system. In such embodiments, the boundaries of such VL FR sequences are also determined in accordance with the ABM numbering system. Thus, provided herein are antibodies or antigen-binding fragments that comprise one or more of the VL FR sequences described above that are determined in accordance with the Kabat numbering scheme, the Chothia numbering scheme, the IMGT numbering system, or the ABM numbering system. As discussed herein, determination of CDRs in accordance with any of the Kabat, Chothia, IMGT or ABM numbering systems is well known to those of skill in the art. As such,

determination of boundaries of VL FR sequences described herein that can be utilized with such CDRs is also well known and routine to those of skill in the art.

5.1.3 Antibodies with specific complementarity determining region sequences

[00193] Provided herein are antibodies and antigen-binding fragments thereof comprising specific complementarity determining region (CDR) sequences that specifically bind to CD47 (*e.g.*, human CD47).

[00194] In one aspect, provided herein is an antibody or an antigen-binding fragment thereof, which specifically binds to CD47 and comprises a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein at least one of the following is satisfied: (1) VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); (2) VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60), WIDPDQGDTEYAQKFQD (SEQ ID NO: 127), or WIDPDQGDTEYAQKFQG (SEQ ID NO: 138); and (3) VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61) or AYGSSSYPM DY (SEQ ID NO: 125).

[00195] In another aspect, provided herein is an antibody or an antigen-binding fragment thereof, which specifically binds to CD47 and comprises a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein (1) VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 59); (2) VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60), WIDPDQGDTEYAQKFQD (SEQ ID NO: 127), or WIDPDQGDTEYAQKFQG (SEQ ID NO: 138); and (3) VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61) or AYGSSSYPM DY (SEQ ID NO: 125).

[00196] In some embodiments, the antibody or antigen-binding fragment further comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein at least one of the following is satisfied: (1) VL CDR1 comprises the amino acid sequence of X_{C1} ASQDIHRYLS (SEQ ID NO: 62), wherein X_{C1} is K or R; (2) VL CDR2 comprises the amino acid sequence of RANRLVS

(SEQ ID NO: 63); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

[00197] In other embodiments, the antibody or antigen-binding fragment further comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of X_{C1} ASQDIHRYLS (SEQ ID NO: 62), wherein X_{C1} is K or R; (2) VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64).

[00198] In other embodiments, the antibody or antigen-binding fragment further comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein at least one of the following is satisfied: (1) VL CDR1 comprises the amino acid sequence of X_{C1} ASQDIHRYLS (SEQ ID NO: 62), wherein X_{C1} is K or R; (2) VL CDR2 comprises the amino acid sequence of $RX_{C2}X_{C3}$ RFVD (SEQ ID NO: 65), wherein X_{C2} is any amino acid with a polar or charged side chain, and X_{C3} is V, I, E, or S; and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64). In a specific embodiment, X_{C2} is Y, E, or H. In a specific embodiment, X_{C1} is R.

[00199] In other embodiments, the antibody or antigen-binding fragment further comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of X_{C1} ASQDIHRYLS (SEQ ID NO: 62), wherein X_{C1} is K or R; (2) VL CDR2 comprises the amino acid sequence of $RX_{C2}X_{C3}$ RFVD (SEQ ID NO: 65), wherein X_{C2} is any amino acid with a polar or charged side chain, and X_{C3} is V, I, E, or S; and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64). In a specific embodiment, X_{C2} is Y, E, or H. In a specific embodiment, X_{C1} is R.

[00200] In other embodiments, the antibody or antigen-binding fragment further comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL CDR2 comprises the

amino acid sequence of $RX_{C2}X_{C3}RFVD$ (SEQ ID NO: 65), wherein X_{C2} is any amino acid with a polar or charged side chain, and X_{C3} is V, I, E, or S. In specific embodiments, X_{C2} is Y, E, or H. In a specific embodiment, X_{C2} is Y and X_{C3} is V. In another specific embodiment, X_{C2} is Y and X_{C3} is I. In another specific embodiment, X_{C2} is Y and X_{C3} is E. In another specific embodiment, X_{C2} is Y and X_{C3} is S. In another specific embodiment, X_{C2} is E and X_{C3} is V. In another specific embodiment, X_{C2} is E and X_{C3} is I. In another specific embodiment, X_{C2} is E and X_{C3} is E. In another specific embodiment, X_{C2} is E and X_{C3} is S. In another specific embodiment, X_{C2} is H and X_{C3} is V. In another specific embodiment, X_{C2} is H and X_{C3} is I. In another specific embodiment, X_{C2} is H and X_{C3} is E. In another specific embodiment, X_{C2} is H and X_{C3} is S. In certain embodiments, VL CDR1 comprises the amino acid sequence of $X_{C1}ASQDIHRYLS$ (SEQ ID NO: 62), wherein X_{C1} is K or R. In a specific embodiment, X_{C1} is R. In certain embodiments, VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

[00201] In another aspect, provided herein is an antibody or an antigen-binding fragment thereof, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein at least one of the following is satisfied: (1) VL CDR1 comprises the amino acid sequence of $X_{C1}ASQDIHRYLS$ (SEQ ID NO: 62), wherein X_{C1} is K or R; (2) VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

[00202] In another aspect, provided herein is an antibody or an antigen-binding fragment thereof, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of $X_{C1}ASQDIHRYLS$ (SEQ ID NO: 62), wherein X_{C1} is K or R; (2) VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

[00203] In another aspect, provided herein is an antibody or an antigen-binding fragment thereof, which specifically binds to CD47 and comprises a VH that comprises four VH

framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein at least one of the following is satisfied: (1) VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 98), GYTFTYLLH (SEQ ID NO: 99), GFTFTYLLH (SEQ ID NO: 100), GYNFTYLLH (SEQ ID NO: 101), GYTITYLLH (SEQ ID NO: 102), GYTFKYLLH (SEQ ID NO: 103), GYTFTDYLLH (SEQ ID NO: 104), GFTFTDYLLH (SEQ ID NO: 105), GFTITDYLLH (SEQ ID NO: 106), GYTFKDYLLH (SEQ ID NO: 107), or GFTFKDYLLH (SEQ ID NO: 108); (2) VH CDR2 comprises the amino acid sequence of WIDPDNGDTE (SEQ ID NO: 109), WIDPDQGDTE (SEQ ID NO: 110), WIDPDYGDTE (SEQ ID NO: 111), WIDPDSGDTE (SEQ ID NO: 112), WIDPDNADTE (SEQ ID NO: 113), WIDPDNTDTE (SEQ ID NO: 114), WIDPDNGDTEFAPKFQG (SEQ ID NO: 129), WIDPDNGDTEYAEKFQG (SEQ ID NO: 130), WIDPDNGDTEYAQKFQD (SEQ ID NO: 131), WIDPDNGDTEYAQKFQG (SEQ ID NO: 132), WIDPDQGDTEYAQKFQD (SEQ ID NO: 127), WIDPDYGDTEYAQKFQD (SEQ ID NO: 133), WIDPDSGDTEYAQKFQD (SEQ ID NO: 134), WIDPDNADTEYAQKFQD (SEQ ID NO: 135), WIDPDNTDTEYAQKFQD (SEQ ID NO: 136), or WIDPDNGTEYAQKFQD (SEQ ID NO: 137); and (3) VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 115), AYGSSSYPM DY (SEQ ID NO: 125), NAAYGSSPYPM DY (SEQ ID NO: 116), or AYGSSPYPM DY (SEQ ID NO: 128).

[00204] In another aspect, provided herein is an antibody or an antigen-binding fragment thereof, which specifically binds to CD47 and comprises a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein (1) VH CDR1 comprises the amino acid sequence of GFNIKDYLLH (SEQ ID NO: 98), GYTFTYLLH (SEQ ID NO: 99), GFTFTYLLH (SEQ ID NO: 100), GYNFTYLLH (SEQ ID NO: 101), GYTITYLLH (SEQ ID NO: 102), GYTFKYLLH (SEQ ID NO: 103), GYTFTDYLLH (SEQ ID NO: 104), GFTFTDYLLH (SEQ ID NO: 105), GFTITDYLLH (SEQ ID NO: 106), GYTFKDYLLH (SEQ ID NO: 107), or GFTFKDYLLH (SEQ ID NO: 108); (2) VH CDR2 comprises the amino acid sequence of WIDPDNGDTE (SEQ ID NO: 109), WIDPDQGDTE (SEQ ID NO: 110), WIDPDYGDTE (SEQ ID NO: 111), WIDPDSGDTE (SEQ ID NO: 112), WIDPDNADTE (SEQ ID NO: 113),

WIDPDNTDTE (SEQ ID NO: 114), WIDPDNGDTEFAPKFQG (SEQ ID NO: 129), WIDPDNGDTEYAIEKFQG (SEQ ID NO: 130), WIDPDNGDTEYAQKFQD (SEQ ID NO: 131), WIDPDNGDTEYAQKFQG (SEQ ID NO: 132), WIDPDQGDTEYAQKFQD (SEQ ID NO: 127), WIDPDYGDTEYAQKFQD (SEQ ID NO: 133), WIDPDSGDTEYAQKFQD (SEQ ID NO: 134), WIDPDNADTEYAQKFQD (SEQ ID NO: 135), WIDPDNTDTEYAQKFQD (SEQ ID NO: 136), or WIDPDNGTEYAQKFQD (SEQ ID NO: 137); and (3) VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 115), AYGSSSYPM DY (SEQ ID NO: 125), NAAYGSSPYPM DY (SEQ ID NO: 116) or AYGSSPYPM DY (SEQ ID NO: 128).

[00205] In some embodiments, the antibody or antigen-binding fragment further comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein at least one of the following is satisfied: (1) VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 117), RASQDIHRYLA (SEQ ID NO: 118), or RARQGIHRYLS (SEQ ID NO: 119); (2) VL CDR2 comprises the amino acid sequence of RANRLVD (SEQ ID NO: 120), RANRLQS (SEQ ID NO: 121), RANRRAT (SEQ ID NO: 122), or RANRLVS (SEQ ID NO: 123); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 124).

[00206] In other embodiments, the antibody or antigen-binding fragment further comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 117), RASQDIHRYLA (SEQ ID NO: 118), or RARQGIHRYLS (SEQ ID NO: 119); (2) VL CDR2 comprises the amino acid sequence of RANRLVD (SEQ ID NO: 120), RANRLQS (SEQ ID NO: 121), RANRRAT (SEQ ID NO: 122), or RANRLVS (SEQ ID NO: 123); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 124).

[00207] In another aspect, provided herein is an antibody or an antigen-binding fragment thereof, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL

FR3-VL CDR3-VL FR4, wherein at least one of the following is satisfied: (1) VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 117), RASQDIHRYLA (SEQ ID NO: 118), or RARQGIHRYLS (SEQ ID NO: 119); (2) VL CDR2 comprises the amino acid sequence of RANRLVD (SEQ ID NO: 120), RANRLQS (SEQ ID NO: 121), RANRRAT (SEQ ID NO: 122), or RANRLVS (SEQ ID NO: 123); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 124).

[00208] In another aspect, provided herein is an antibody or an antigen-binding fragment thereof, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of KASQDIHRYLS (SEQ ID NO: 117), RASQDIHRYLA (SEQ ID NO: 118), or RARQGIHRYLS (SEQ ID NO: 119); (2) VL CDR2 comprises the amino acid sequence of RANRLVD (SEQ ID NO: 120), RANRLQS (SEQ ID NO: 121), RANRRAT (SEQ ID NO: 122), or RANRLVS (SEQ ID NO: 123); and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 124).

[00209] In another aspect, provided herein is an antibody or an antigen-binding fragment thereof, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein at least one of the following is satisfied: (1) VL CDR1 comprises the amino acid sequence of X_{C1} ASQDIHRYLS (SEQ ID NO: 62), wherein X_{C1} is K or R; (2) VL CDR2 comprises the amino acid sequence of $RX_{C2}X_{C3}$ RFVD (SEQ ID NO: 65), wherein X_{C2} is any amino acid with a polar or charged side chain, and X_{C3} is V, I, E, or S; and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPTYT (SEQ ID NO: 64). In a specific embodiment, X_{C2} is Y, E, or H. In a specific embodiment, X_{C1} is R.

[00210] In another aspect, provided herein is an antibody or an antigen-binding fragment thereof, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein (1) VL CDR1 comprises the amino acid sequence of

X_{C1} ASQDIHRYLS (SEQ ID NO: 62), wherein X_{C1} is K or R; (2) VL CDR2 comprises the amino acid sequence of $RX_{C2}X_{C3}RFVD$ (SEQ ID NO: 65), wherein X_{C2} is any amino acid with a polar or charged side chain, and X_{C3} is V, I, E, or S; and (3) VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64). In a specific embodiment, X_{C2} is Y, E, or H. In a specific embodiment, X_{C1} is R.

[00211] In another aspect, provided herein is an antibody or an antigen-binding fragment thereof, which specifically binds to CD47 and comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL CDR2 comprises the amino acid sequence of $RX_{C2}X_{C3}RFVD$ (SEQ ID NO: 65), wherein X_{C2} is any amino acid with a polar or charged side chain, and X_{C3} is V, I, E, or S. In specific embodiments, X_{C2} is Y, E, or H. In a specific embodiment, X_{C2} is Y and X_{C3} is V. In another specific embodiment, X_{C2} is Y and X_{C3} is I. In another specific embodiment, X_{C2} is Y and X_{C3} is E. In another specific embodiment, X_{C2} is Y and X_{C3} is S. In another specific embodiment, X_{C2} is E and X_{C3} is V. In another specific embodiment, X_{C2} is E and X_{C3} is I. In another specific embodiment, X_{C2} is E and X_{C3} is E. In another specific embodiment, X_{C2} is E and X_{C3} is S. In another specific embodiment, X_{C2} is H and X_{C3} is V. In another specific embodiment, X_{C2} is H and X_{C3} is I. In another specific embodiment, X_{C2} is H and X_{C3} is E. In another specific embodiment, X_{C2} is H and X_{C3} is S. In certain embodiments, VL CDR1 comprises the amino acid sequence of X_{C1} ASQDIHRYLS (SEQ ID NO: 62), wherein X_{C1} is K or R. In a specific embodiment, X_{C1} is R. In certain embodiments, VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64).

[00212] In a specific embodiment, provided herein is an antibody or antigen-binding fragment thereof of any listed in Table 3, which comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence listed in the second column of Table 3 for the antibody or antigen-binding fragment, VH FR2 comprises the amino acid sequence listed in the sixth column of Table 3 for the antibody or antigen-binding fragment, VH FR3 comprises the amino acid sequence listed in the 10th column of Table 3 for the antibody or antigen-binding fragment, VH FR4 comprises the amino acid sequence listed in the 14th column of Table 3 for

the antibody or antigen-binding fragment, VH CDR1 comprises the amino acid sequence listed in the fourth column of Table 3 for the antibody or antigen-binding fragment, VH CDR2 comprises the amino acid sequence listed in the eighth column of Table 3 for the antibody or antigen-binding fragment, and VH CDR3 comprises the amino acid sequence listed in the 12nd column of Table 3 for the antibody or antigen-binding fragment.

[00213] Table 3. Exemplary Antibodies with Specific VH FR sequences and specific VH CDR sequences (X_{H1} is M or no amino acid).

Anti-body	VH - FRI	SEQ ID NO:	VH - CDR 1	SEQ ID NO:	VH - FR2	SEQ ID NO:	VH - CDR 2	SEQ ID NO:	VH - FR3	SEQ ID NO:	VH - CDR 3	SEQ ID NO:	VH - FR4	SEQ ID NO:
	X_{H1} QMQLVQS								YAQKFQDRVTITR					
Ab496	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 13)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELSS	(SEQ ID NO: 14)	NAAYGSS	(SEQ ID NO: 61)	WGQGTT	(SEQ ID NO: 15)
	SVKVSCCKAS		YYLH		KALEWMG		GDTE		LRSEDAMYYC		SYPMDY		VTVSS	
	X_{H1} QMQLVQS								YAQKFQDRVTITR					
Ab497	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 16)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELSS	(SEQ ID NO: 14)	NAAYGSS	(SEQ ID NO: 61)	WGQGTT	(SEQ ID NO: 15)
	SVKVSCCKAS		YYLH		QGLEWMG		GDTE		LRSEDAMYYC		SYPMDY		VTVSS	
	X_{H1} QMQLVQS								YAQKFQDRVTITR					
Ab498	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 17)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELSS	(SEQ ID NO: 18)	NAAYGSS	(SEQ ID NO: 61)	WGQGTT	(SEQ ID NO: 15)
	SVKVSCCKAS		YYLH		QALEWMG		GDTE		LRAEDTAMYYC		SYPMDY		VTVSS	
	X_{H1} QMQLVQS								YAQKFQDRVTITR					
Ab499	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 17)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELSS	(SEQ ID NO: 14)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 19)
	SVKVSCCKAS		YYLH		KALEWMG		GDTE		LRSEDAMYYC		SYPMDY		VTVSS	
	X_{H1} QMQLVQS								YAQKFQDRVTITR					
Ab500	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 20)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELSS	(SEQ ID NO: 14)	NAAYGSS	(SEQ ID NO: 61)	WGQGTT	(SEQ ID NO: 15)
	SVKVSCCKAS		YYLH		KGLEWMG		GDTE		LRSEDAMYYC		SYPMDY		VTVSS	
	X_{H1} QMQLVQS								YAQKFQDRVTITR					
Ab501	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 13)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELSS	(SEQ ID NO: 18)	NAAYGSS	(SEQ ID NO: 61)	WGQGTT	(SEQ ID NO: 15)
	SVKVSCCKAS		YYLH		KALEWMG		GDTE		LRAEDTAMYYC		SYPMDY		VTVSS	
	X_{H1} QMQLVQS								YAQKFQDRVTITR					
Ab502	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 13)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELSS	(SEQ ID NO: 14)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 19)
	SVKVSCCKAS		YYLH		KALEWMG		GDTE		LRSEDAMYYC		SYPMDY		VTVSS	
Ab503	X_{H1} QMQLVQS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 13)	WIDPDQ	(SEQ ID NO: 60)	YAQKFQDRVTITR	(SEQ ID NO: 14)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 19)

	GAEVKKTGS SVKVSCAS	NO: 12)	YYLH	NO: 59)	QGLEWMG	NO: 16)	GDTE	NO: 60)	DRSMSTAYMELSS LRAEDTAMYYC	NO: 18)	SYPMDY	NO: 61)	VTVSS	NO: 15)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 16)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELSS	(SEQ ID NO: 14)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 19)
Ab504	SVKVSCAS	NO: 12)	YYLH	NO: 59)	QGLEWMG	NO: 16)	GDTE	NO: 60)	LRSEDAMYYC	NO: 18)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 17)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELSS	(SEQ ID NO: 18)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 19)
Ab505	SVKVSCAS	NO: 12)	YYLH	NO: 59)	QALEWMG	NO: 17)	GDTE	NO: 60)	LRAEDTAMYYC	NO: 18)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 20)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELSS	(SEQ ID NO: 18)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 15)
Ab506	SVKVSCAS	NO: 12)	YYLH	NO: 59)	KGLEWMG	NO: 20)	GDTE	NO: 60)	LRAEDTAMYYC	NO: 18)	SYPMDY	NO: 61)	VTVSS	NO: 15)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 20)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELSS	(SEQ ID NO: 14)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 19)
Ab507	SVKVSCAS	NO: 12)	YYLH	NO: 59)	KGLEWMG	NO: 20)	GDTE	NO: 60)	LRSEDAMYYC	NO: 14)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 13)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELSS	(SEQ ID NO: 18)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 19)
Ab508	SVKVSCAS	NO: 12)	YYLH	NO: 59)	KALEWMG	NO: 13)	GDTE	NO: 60)	LRAEDTAMYYC	NO: 18)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 16)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELSS	(SEQ ID NO: 18)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 19)
Ab509	SVKVSCAS	NO: 12)	YYLH	NO: 59)	QGLEWMG	NO: 16)	GDTE	NO: 60)	LRAEDTAMYYC	NO: 18)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 20)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELSS	(SEQ ID NO: 18)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 19)
Ab510	SVKVSCAS	NO: 12)	YYLH	NO: 59)	KGLEWMG	NO: 20)	GDTE	NO: 60)	LRAEDTAMYYC	NO: 18)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 13)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELSS	(SEQ ID NO: 14)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 15)
Ab511	SVKVSCAS	NO: 21)	YYLH	NO: 59)	KALEWMG	NO: 13)	GDTE	NO: 60)	LRSEDAMYYC	NO: 14)	SYPMDY	NO: 61)	VTVSS	NO: 15)

Ab512	X _{H1} QMLVQS GAEVKKTGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KALEWMG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSMSTAYMELSS LRSEDAMYYC	(SEQ ID NO: 22)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTSS	(SEQ ID NO: 15)
Ab513	X _{H1} QMLVQS GAEVKKTGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KALEWMG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQDRVTITR DRSTSTAYMELSS LRSEDAMYYC	(SEQ ID NO: 23)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTSS	(SEQ ID NO: 15)
Ab514	X _{H1} QMLVQS GAEVKKTGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KALEWMG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQDRVTITR DRSMSTAYMELRS LRSEDAMYYC	(SEQ ID NO: 24)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTSS	(SEQ ID NO: 15)
Ab515	X _{H1} QMLVQS GAEVKKTGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KALEWMG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQDRVTITR DRSMSTAYMELSS LRSEDAMYYC	(SEQ ID NO: 25)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTSS	(SEQ ID NO: 15)
Ab516	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KALEWMG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSMSTAYMELSS LRSEDAMYYC	(SEQ ID NO: 22)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTSS	(SEQ ID NO: 15)
Ab517	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KALEWMG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQDRVTITR DRSTSTAYMELSS LRSEDAMYYC	(SEQ ID NO: 23)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTSS	(SEQ ID NO: 15)
Ab518	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KALEWMG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQDRVTITR DRSMSTAYMELRS LRSEDAMYYC	(SEQ ID NO: 24)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTSS	(SEQ ID NO: 15)
Ab519	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KALEWMG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQDRVTITR DRSMSTAYMELSS LRSEDAMYYC	(SEQ ID NO: 25)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTSS	(SEQ ID NO: 15)
Ab520	X _{H1} QMLVQS GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KALEWMG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSTSTAYMELSS	(SEQ ID NO: 26)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTSS	(SEQ ID NO: 15)

	GAEVKKPGS SVKVSCKAS	NO: 21)	YYLH	NO: 59)	KALEWMG	NO: 13)	GDTE	NO: 60)	DRSTSTAYMELRS LRSEDAMYYC	NO: 29)	SYPMDY	NO: 61)	VTVSS	NO: 15)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 13)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELSS	(SEQ ID NO: 30)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 15)
Ab530	SVKVSCKAS	NO: 21)	YYLH	NO: 59)	KALEWMG	NO: 13)	GDTE	NO: 60)	LRSEDAMYYC	NO: 30)	SYPMDY	NO: 61)	VTVSS	NO: 15)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 13)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELRS	(SEQ ID NO: 31)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 15)
Ab531	SVKVSCKAS	NO: 21)	YYLH	NO: 59)	KALEWMG	NO: 13)	GDTE	NO: 60)	LRSEDAMYYC	NO: 31)	SYPMDY	NO: 61)	VTVSS	NO: 15)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 13)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELRS	(SEQ ID NO: 32)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 15)
Ab532	SVKVSCKAS	NO: 12)	YYLH	NO: 59)	KALEWMG	NO: 13)	GDTE	NO: 60)	LRSEDAMYYC	NO: 32)	SYPMDY	NO: 61)	VTVSS	NO: 15)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 13)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELSS	(SEQ ID NO: 33)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 15)
Ab533	SVKVSCKAS	NO: 12)	YYLH	NO: 59)	KALEWMG	NO: 13)	GDTE	NO: 60)	LRSEDAMYYC	NO: 33)	SYPMDY	NO: 61)	VTVSS	NO: 15)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 13)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELRS	(SEQ ID NO: 34)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 15)
Ab534	SVKVSCKAS	NO: 12)	YYLH	NO: 59)	KALEWMG	NO: 13)	GDTE	NO: 60)	LRSEDAMYYC	NO: 34)	SYPMDY	NO: 61)	VTVSS	NO: 15)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 13)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELRS	(SEQ ID NO: 35)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 15)
Ab535	SVKVSCKAS	NO: 12)	YYLH	NO: 59)	KALEWMG	NO: 13)	GDTE	NO: 60)	LRSEDAMYYC	NO: 35)	SYPMDY	NO: 61)	VTVSS	NO: 15)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 13)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELRS	(SEQ ID NO: 32)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 15)
Ab536	SVKVSCKAS	NO: 21)	YYLH	NO: 59)	KALEWMG	NO: 13)	GDTE	NO: 60)	LRSEDAMYYC	NO: 32)	SYPMDY	NO: 61)	VTVSS	NO: 15)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 13)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELSS	(SEQ ID NO: 33)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 15)
Ab537	SVKVSCKAS	NO: 21)	YYLH	NO: 59)	KALEWMG	NO: 13)	GDTE	NO: 60)	LRSEDAMYYC	NO: 33)	SYPMDY	NO: 61)	VTVSS	NO: 15)

Ab538	X _{H1} QMQLVQS GAEVKKPGS SVKVSCCKAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KALEWMG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKQFQGRVTITR DRSMSTAYMELRS LRSEDTAVYYC	(SEQ ID NO: 34)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGTT VTVSS	(SEQ ID NO: 15)
Ab539	X _{H1} QMQLVQS GAEVKKPGS SVKVSCCKAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KALEWMG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKQFQGRVTITR DRSTSTAYMELRS LRSEDTAVYYC	(SEQ ID NO: 35)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGTT VTVSS	(SEQ ID NO: 15)
Ab540	X _{H1} QMQLVQS GAEVKKPGS SVKVSCCKAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KALEWMG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKQFQGRVTITR DRSTSTAYMELRS LRSEDTAVYYC	(SEQ ID NO: 36)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGTT VTVSS	(SEQ ID NO: 15)
Ab541	X _{H1} QMQLVQS GAEVKKPGS SVKVSCCKAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KALEWMG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKQFQGRVTITR DRSTSTAYMELRS LRSEDTAVYYC	(SEQ ID NO: 36)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGTT VTVSS	(SEQ ID NO: 15)
Ab542	X _{H1} QMQLVQS GAEVKKPGS SVKVSCCKAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QGLEWMG	(SEQ ID NO: 16)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKQFQGRVTITR DRSMSTAYMELSS LRSEDTAMYYC	(SEQ ID NO: 14)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGTT VTVSS	(SEQ ID NO: 15)
Ab543	X _{H1} QMQLVQS GAEVKKPGS SVKVSCCKAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QGLEWMG	(SEQ ID NO: 16)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKQFQGRVTITR DRSMSTAYMELSS LRSEDTAMYYC	(SEQ ID NO: 22)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGTT VTVSS	(SEQ ID NO: 15)
Ab544	X _{H1} QMQLVQS GAEVKKPGS SVKVSCCKAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QGLEWMG	(SEQ ID NO: 16)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKQFQGRVTITR DRSTSTAYMELSS LRSEDTAMYYC	(SEQ ID NO: 23)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGTT VTVSS	(SEQ ID NO: 15)
Ab545	X _{H1} QMQLVQS GAEVKKPGS SVKVSCCKAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QGLEWMG	(SEQ ID NO: 16)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKQFQGRVTITR DRSMSTAYMELRS LRSEDTAMYYC	(SEQ ID NO: 24)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGTT VTVSS	(SEQ ID NO: 15)
Ab546	X _{H1} QMQLVQS GAEVKKPGS SVKVSCCKAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QGLEWMG	(SEQ ID NO: 16)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKQFQGRVTITR DRSMSTAYMELSS LRSEDTAMYYC	(SEQ ID NO: 25)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGTT VTVSS	(SEQ ID NO: 15)

	GAEVKKTGS SVKVSCKAS	NO: 12)	YYLH	NO: 59)	QGLEWMG	NO: 16)	GDTE	NO: 60)	DRSTSTAYMELSS LRSEDTAVYYC	NO: 30)	SYPMDY	NO: 61)	VTVSS	NO: 15)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
Ab556	GAEVKKTGS SVKVSCKAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 16)	WIDPDQ GDTE	(SEQ ID NO: 60)	DRSMSTAYMELRS LRSEDTAVYYC	(SEQ ID NO: 31)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGTT VTVSS	(SEQ ID NO: 15)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
Ab557	GAEVKKPGS SVKVSCKAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 16)	WIDPDQ GDTE	(SEQ ID NO: 60)	DRSTSTAYMELSS LRSEDTAMYYC	(SEQ ID NO: 26)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGTT VTVSS	(SEQ ID NO: 15)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
Ab558	GAEVKKPGS SVKVSCKAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 16)	WIDPDQ GDTE	(SEQ ID NO: 60)	DRSMSTAYMELRS LRSEDTAMYYC	(SEQ ID NO: 27)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGTT VTVSS	(SEQ ID NO: 15)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
Ab559	GAEVKKPGS SVKVSCKAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 16)	WIDPDQ GDTE	(SEQ ID NO: 60)	DRSMSTAYMELSS LRSEDTAVYYC	(SEQ ID NO: 28)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGTT VTVSS	(SEQ ID NO: 15)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
Ab560	GAEVKKPGS SVKVSCKAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 16)	WIDPDQ GDTE	(SEQ ID NO: 60)	DRSTSTAYMELRS LRSEDTAMYYC	(SEQ ID NO: 29)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGTT VTVSS	(SEQ ID NO: 15)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
Ab561	GAEVKKPGS SVKVSCKAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 16)	WIDPDQ GDTE	(SEQ ID NO: 60)	DRSTSTAYMELSS LRSEDTAVYYC	(SEQ ID NO: 30)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGTT VTVSS	(SEQ ID NO: 15)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
Ab562	GAEVKKPGS SVKVSCKAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 16)	WIDPDQ GDTE	(SEQ ID NO: 60)	DRSMSTAYMELRS LRSEDTAVYYC	(SEQ ID NO: 31)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGTT VTVSS	(SEQ ID NO: 15)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
Ab563	GAEVKKTGS SVKVSCKAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 16)	WIDPDQ GDTE	(SEQ ID NO: 60)	DRSTSTAYMELRS LRSEDTAMYYC	(SEQ ID NO: 32)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGTT VTVSS	(SEQ ID NO: 15)

Ab564	X _{H1} QMLVQS GAEVKKTGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QGLEWMG	(SEQ ID NO: 16)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSTSTAYMELSS LRSEDTAVYYC	(SEQ ID NO: 33)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 15)
Ab565	X _{H1} QMLVQS GAEVKKTGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QGLEWMG	(SEQ ID NO: 16)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSMSTAYMELRS LRSEDTAVYYC	(SEQ ID NO: 34)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 15)
Ab566	X _{H1} QMLVQS GAEVKKTGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QGLEWMG	(SEQ ID NO: 16)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSTSTAYMELRS LRSEDTAVYYC	(SEQ ID NO: 35)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 15)
Ab567	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QGLEWMG	(SEQ ID NO: 16)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSTSTAYMELRS LRSEDTAMYYC	(SEQ ID NO: 32)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 15)
Ab568	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QGLEWMG	(SEQ ID NO: 16)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSTSTAYMELSS LRSEDTAVYYC	(SEQ ID NO: 33)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 15)
Ab569	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QGLEWMG	(SEQ ID NO: 16)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSMSTAYMELRS LRSEDTAVYYC	(SEQ ID NO: 34)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 15)
Ab570	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QGLEWMG	(SEQ ID NO: 16)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSTSTAYMELRS LRSEDTAVYYC	(SEQ ID NO: 35)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 15)
Ab571	X _{H1} QMLVQS GAEVKKTGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QGLEWMG	(SEQ ID NO: 16)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSTSTAYMELRS LRSEDTAVYYC	(SEQ ID NO: 36)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 15)
Ab572	X _{H1} QMLVQS GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QGLEWMG	(SEQ ID NO: 16)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSTSTAYMELRS	(SEQ ID NO: 36)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 15)

[illegible]

	GAEVKKPGS SVKVSCKAS	NO: 21)	YYLH	NO: 59)	QALEWMG	NO: 17)	GDTE	NO: 60)	DRSMSTAYMELSS LRAEDTAVYYC	NO: 40)	SYPMDY	NO: 61)	VTVSS	NO: 15)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
Ab582	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 17)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELSS	(SEQ ID NO: 41)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 15)
	SVKVSCKAS	NO: 12)	YYLH	NO: 59)	QALEWMG	NO: 17)	GDTE	NO: 60)	LRAEDTAMYYC	NO: 41)	SYPMDY	NO: 61)	VTVSS	NO: 15)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
Ab583	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 17)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELRS	(SEQ ID NO: 42)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 15)
	SVKVSCKAS	NO: 12)	YYLH	NO: 59)	QALEWMG	NO: 17)	GDTE	NO: 60)	LRAEDTAMYYC	NO: 42)	SYPMDY	NO: 61)	VTVSS	NO: 15)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
Ab584	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 17)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELSS	(SEQ ID NO: 43)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 15)
	SVKVSCKAS	NO: 12)	YYLH	NO: 59)	QALEWMG	NO: 17)	GDTE	NO: 60)	LRAEDTAVYYC	NO: 43)	SYPMDY	NO: 61)	VTVSS	NO: 15)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
Ab585	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 17)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELRS	(SEQ ID NO: 44)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 15)
	SVKVSCKAS	NO: 12)	YYLH	NO: 59)	QALEWMG	NO: 17)	GDTE	NO: 60)	LRAEDTAMYYC	NO: 44)	SYPMDY	NO: 61)	VTVSS	NO: 15)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
Ab586	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 17)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELSS	(SEQ ID NO: 45)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 15)
	SVKVSCKAS	NO: 12)	YYLH	NO: 59)	QALEWMG	NO: 17)	GDTE	NO: 60)	LRAEDTAVYYC	NO: 45)	SYPMDY	NO: 61)	VTVSS	NO: 15)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
Ab587	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 17)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELRS	(SEQ ID NO: 46)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 15)
	SVKVSCKAS	NO: 12)	YYLH	NO: 59)	QALEWMG	NO: 17)	GDTE	NO: 60)	LRAEDTAVYYC	NO: 46)	SYPMDY	NO: 61)	VTVSS	NO: 15)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
Ab588	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 17)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELSS	(SEQ ID NO: 41)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 15)
	SVKVSCKAS	NO: 21)	YYLH	NO: 59)	QALEWMG	NO: 17)	GDTE	NO: 60)	LRAEDTAMYYC	NO: 41)	SYPMDY	NO: 61)	VTVSS	NO: 15)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
Ab589	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 17)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELRS	(SEQ ID NO: 42)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 15)
	SVKVSCKAS	NO: 21)	YYLH	NO: 59)	QALEWMG	NO: 17)	GDTE	NO: 60)	LRAEDTAMYYC	NO: 42)	SYPMDY	NO: 61)	VTVSS	NO: 15)

Ab590	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QALEWMG	(SEQ ID NO: 17)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSMSTAYMELSS LRAEDTAVYYC	(SEQ ID NO: 43)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 15)
Ab591	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QALEWMG	(SEQ ID NO: 17)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQDRVTITR DRSTSTAYMELRS LRAEDTAMYYC	(SEQ ID NO: 44)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 15)
Ab592	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QALEWMG	(SEQ ID NO: 17)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQDRVTITR DRSTSTAYMELSS LRAEDTAVYYC	(SEQ ID NO: 45)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 15)
Ab593	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QALEWMG	(SEQ ID NO: 17)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQDRVTITR DRSMSTAYMELRS LRAEDTAVYYC	(SEQ ID NO: 46)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 15)
Ab594	X _{H1} QMLVQS GAEVKKTGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QALEWMG	(SEQ ID NO: 17)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSTSTAYMELRS LRAEDTAMYYC	(SEQ ID NO: 47)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 15)
Ab595	X _{H1} QMLVQS GAEVKKTGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QALEWMG	(SEQ ID NO: 17)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSTSTAYMELSS LRAEDTAVYYC	(SEQ ID NO: 48)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 15)
Ab596	X _{H1} QMLVQS GAEVKKTGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QALEWMG	(SEQ ID NO: 17)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSMSTAYMELRS LRAEDTAVYYC	(SEQ ID NO: 49)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 15)
Ab597	X _{H1} QMLVQS GAEVKKTGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QALEWMG	(SEQ ID NO: 17)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQDRVTITR DRSTSTAYMELRS LRAEDTAVYYC	(SEQ ID NO: 50)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 15)
Ab598	X _{H1} QMLVQS GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QALEWMG	(SEQ ID NO: 17)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSTSTAYMELRS	(SEQ ID NO: 47)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 15)

	SVKVSCKAS								LRAEDTAMYYC					
	X _{H1} QMLVQS	(SEQ ID NO: 21)	GFSNID	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 17)	WIDPDQ	(SEQ ID NO: 60)	YAKFQGRVTITR					
Ab599	GAEVKKPGS	(SEQ ID NO: 21)	YVLH	(SEQ ID NO: 59)	QALEWMG	(SEQ ID NO: 17)	GDTE	(SEQ ID NO: 60)	DRSTSTAYMELSS	(SEQ ID NO: 48)	NAAVGSS	(SEQ ID NO: 61)	WGQGTT	(SEQ ID NO: 15)
	SVKVSCKAS								LRAEDTAVYYC		SYPMDY		VTVSS	
	X _{H1} QMLVQS	(SEQ ID NO: 21)	GFSNID	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 17)	WIDPDQ	(SEQ ID NO: 60)	YAKFQGRVTITR					
Ab600	GAEVKKPGS	(SEQ ID NO: 21)	YVLH	(SEQ ID NO: 59)	QALEWMG	(SEQ ID NO: 17)	GDTE	(SEQ ID NO: 60)	DRSMSTAYMELRS	(SEQ ID NO: 49)	NAAVGSS	(SEQ ID NO: 61)	WGQGTT	(SEQ ID NO: 15)
	SVKVSCKAS								LRAEDTAVYYC		SYPMDY		VTVSS	
Ab601	X _{H1} QMLVQS	(SEQ ID NO: 21)	GFSNID	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 17)	WIDPDQ	(SEQ ID NO: 60)	YAKFQGRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	YVLH	(SEQ ID NO: 59)	QALEWMG	(SEQ ID NO: 17)	GDTE	(SEQ ID NO: 60)	DRSTSTAYMELRS	(SEQ ID NO: 50)	NAAVGSS	(SEQ ID NO: 61)	WGQGTT	(SEQ ID NO: 15)
	SVKVSCKAS								LRAEDTAVYYC		SYPMDY		VTVSS	
Ab602	X _{H1} QMLVQS	(SEQ ID NO: 12)	GFSNID	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 17)	WIDPDQ	(SEQ ID NO: 60)	YAKFQGRVTITR					
	GAEVKKTGS	(SEQ ID NO: 12)	YVLH	(SEQ ID NO: 59)	QALEWMG	(SEQ ID NO: 17)	GDTE	(SEQ ID NO: 60)	DRSTSTAYMELRS	(SEQ ID NO: 139)	NAAVGSS	(SEQ ID NO: 61)	WGQGTT	(SEQ ID NO: 15)
	SVKVSCKAS								LRAEDTAVYYC		SYPMDY		VTVSS	
Ab603	X _{H1} QMLVQS	(SEQ ID NO: 21)	GFSNID	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 17)	WIDPDQ	(SEQ ID NO: 60)	YAKFQGRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	YVLH	(SEQ ID NO: 59)	QALEWMG	(SEQ ID NO: 17)	GDTE	(SEQ ID NO: 60)	DRSTSTAYMELRS	(SEQ ID NO: 139)	NAAVGSS	(SEQ ID NO: 61)	WGQGTT	(SEQ ID NO: 15)
	SVKVSCKAS								LRAEDTAVYYC		SYPMDY		VTVSS	
Ab604	X _{H1} QMLVQS	(SEQ ID NO: 21)	GFSNID	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 17)	WIDPDQ	(SEQ ID NO: 60)	YAKFQGRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	YVLH	(SEQ ID NO: 59)	QALEWMG	(SEQ ID NO: 17)	GDTE	(SEQ ID NO: 60)	DRSMSTAYMELSS	(SEQ ID NO: 14)	NAAVGSS	(SEQ ID NO: 61)	WGQGTL	(SEQ ID NO: 19)
	SVKVSCKAS								LRSEDAMYYC		SYPMDY		VTVSS	
Ab605	X _{H1} QMLVQS	(SEQ ID NO: 12)	GFSNID	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 17)	WIDPDQ	(SEQ ID NO: 60)	YAKFQGRVTITR					
	GAEVKKTGS	(SEQ ID NO: 12)	YVLH	(SEQ ID NO: 59)	QALEWMG	(SEQ ID NO: 17)	GDTE	(SEQ ID NO: 60)	DRSMSTAYMELSS	(SEQ ID NO: 22)	NAAVGSS	(SEQ ID NO: 61)	WGQGTL	(SEQ ID NO: 19)
	SVKVSCKAS								LRSEDAMYYC		SYPMDY		VTVSS	
Ab606	X _{H1} QMLVQS	(SEQ ID NO: 12)	GFSNID	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 17)	WIDPDQ	(SEQ ID NO: 60)	YAKFQGRVTITR					
	GAEVKKTGS	(SEQ ID NO: 12)	YVLH	(SEQ ID NO: 59)	QALEWMG	(SEQ ID NO: 17)	GDTE	(SEQ ID NO: 60)	DRSTSTAYMELSS	(SEQ ID NO: 23)	NAAVGSS	(SEQ ID NO: 61)	WGQGTL	(SEQ ID NO: 19)
	SVKVSCKAS								LRSEDAMYYC		SYPMDY		VTVSS	
Ab607	X _{H1} QMLVQS	(SEQ ID NO: 12)	GFSNID	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 17)	WIDPDQ	(SEQ ID NO: 60)	YAKFQGRVTITR					
	SVKVSCKAS								LRAEDTAVYYC		NAAVGSS	(SEQ ID NO: 61)	WGQGTL	(SEQ ID NO: 15)

	GAEVKKTGS SVKVSCAS	NO: 12)	YYLH	NO: 59)	QALEWMG	NO: 17)	GDTE	NO: 60)	DRSMSTAYMELRS LRSEDTAMYCY	NO: 24)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 17)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELSS	(SEQ ID NO: 25)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 19)
Ab608	SVKVSCAS	NO: 12)	YYLH	NO: 59)	QALEWMG	NO: 17)	GDTE	NO: 60)	LRSEDTAVVYC	NO: 25)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 17)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELSS	(SEQ ID NO: 22)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 19)
Ab609	SVKVSCAS	NO: 21)	YYLH	NO: 59)	QALEWMG	NO: 17)	GDTE	NO: 60)	LRSEDTAMYCY	NO: 22)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 17)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELSS	(SEQ ID NO: 23)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 19)
Ab610	SVKVSCAS	NO: 21)	YYLH	NO: 59)	QALEWMG	NO: 17)	GDTE	NO: 60)	LRSEDTAMYCY	NO: 23)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 17)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELRS	(SEQ ID NO: 24)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 19)
Ab611	SVKVSCAS	NO: 21)	YYLH	NO: 59)	QALEWMG	NO: 17)	GDTE	NO: 60)	LRSEDTAMYCY	NO: 24)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 17)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELSS	(SEQ ID NO: 25)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 19)
Ab612	SVKVSCAS	NO: 21)	YYLH	NO: 59)	QALEWMG	NO: 17)	GDTE	NO: 60)	LRSEDTAVVYC	NO: 25)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 17)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELSS	(SEQ ID NO: 26)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 19)
Ab613	SVKVSCAS	NO: 12)	YYLH	NO: 59)	QALEWMG	NO: 17)	GDTE	NO: 60)	LRSEDTAMYCY	NO: 26)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 17)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELRS	(SEQ ID NO: 27)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 19)
Ab614	SVKVSCAS	NO: 12)	YYLH	NO: 59)	QALEWMG	NO: 17)	GDTE	NO: 60)	LRSEDTAMYCY	NO: 27)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 17)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELSS	(SEQ ID NO: 28)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 19)
Ab615	SVKVSCAS	NO: 12)	YYLH	NO: 59)	QALEWMG	NO: 17)	GDTE	NO: 60)	LRSEDTAVVYC	NO: 28)	SYPMDY	NO: 61)	VTVSS	NO: 19)

Ab616	X _{H1} QMLVQS GAEVKKTGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QALEWMG	(SEQ ID NO: 17)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQDRVTITR DRSTSTAYMELRS LRSEDAMYYC	(SEQ ID NO: 29)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)
Ab617	X _{H1} QMLVQS GAEVKKTGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QALEWMG	(SEQ ID NO: 17)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQDRVTITR DRSTSTAYMELSS LRSEDAMYYC	(SEQ ID NO: 30)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)
Ab618	X _{H1} QMLVQS GAEVKKTGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QALEWMG	(SEQ ID NO: 17)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQDRVTITR DRSMSTAYMELRS LRSEDAMYYC	(SEQ ID NO: 31)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)
Ab619	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QALEWMG	(SEQ ID NO: 17)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSTSTAYMELSS LRSEDAMYYC	(SEQ ID NO: 26)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)
Ab620	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QALEWMG	(SEQ ID NO: 17)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSMSTAYMELRS LRSEDAMYYC	(SEQ ID NO: 27)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)
Ab621	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QALEWMG	(SEQ ID NO: 17)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSMSTAYMELSS LRSEDAMYYC	(SEQ ID NO: 28)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)
Ab622	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QALEWMG	(SEQ ID NO: 17)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQDRVTITR DRSTSTAYMELRS LRSEDAMYYC	(SEQ ID NO: 29)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)
Ab623	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QALEWMG	(SEQ ID NO: 17)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQDRVTITR DRSTSTAYMELSS LRSEDAMYYC	(SEQ ID NO: 30)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)
Ab624	X _{H1} QMLVQS GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QALEWMG	(SEQ ID NO: 17)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQDRVTITR DRSMSTAYMELRS	(SEQ ID NO: 31)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)

[illegible]

	GAEVKKTGS SVKVSCKAS	NO: 12)	YYLH	NO: 59)	QALEWMG	NO: 17)	GDTE	NO: 60)	DRSTSTAYMELRS LRSEDTAVYYC	NO: 36)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 17)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELRS	(SEQ ID NO: 36)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 19)
Ab634	SVKVSCKAS	NO: 21)	YYLH	NO: 59)	QALEWMG	NO: 17)	GDTE	NO: 60)	LRSEDTAVYYC	NO: 36)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 20)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELSS	(SEQ ID NO: 14)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 15)
Ab635	SVKVSCKAS	NO: 21)	YYLH	NO: 59)	KGLEWMG	NO: 20)	GDTE	NO: 60)	LRSEDTAMYYC	NO: 14)	SYPMDY	NO: 61)	VTVSS	NO: 15)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 20)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELSS	(SEQ ID NO: 22)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 15)
Ab636	SVKVSCKAS	NO: 12)	YYLH	NO: 59)	KGLEWMG	NO: 20)	GDTE	NO: 60)	LRSEDTAMYYC	NO: 22)	SYPMDY	NO: 61)	VTVSS	NO: 15)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 20)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELSS	(SEQ ID NO: 23)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 15)
Ab637	SVKVSCKAS	NO: 12)	YYLH	NO: 59)	KGLEWMG	NO: 20)	GDTE	NO: 60)	LRSEDTAMYYC	NO: 23)	SYPMDY	NO: 61)	VTVSS	NO: 15)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 20)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELRS	(SEQ ID NO: 24)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 15)
Ab638	SVKVSCKAS	NO: 12)	YYLH	NO: 59)	KGLEWMG	NO: 20)	GDTE	NO: 60)	LRSEDTAMYYC	NO: 24)	SYPMDY	NO: 61)	VTVSS	NO: 15)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 20)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELSS	(SEQ ID NO: 25)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 15)
Ab639	SVKVSCKAS	NO: 12)	YYLH	NO: 59)	KGLEWMG	NO: 20)	GDTE	NO: 60)	LRSEDTAVYYC	NO: 25)	SYPMDY	NO: 61)	VTVSS	NO: 15)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 20)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELSS	(SEQ ID NO: 22)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 15)
Ab640	SVKVSCKAS	NO: 21)	YYLH	NO: 59)	KGLEWMG	NO: 20)	GDTE	NO: 60)	LRSEDTAMYYC	NO: 22)	SYPMDY	NO: 61)	VTVSS	NO: 15)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 20)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELSS	(SEQ ID NO: 23)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 15)
Ab641	SVKVSCKAS	NO: 21)	YYLH	NO: 59)	KGLEWMG	NO: 20)	GDTE	NO: 60)	LRSEDTAMYYC	NO: 23)	SYPMDY	NO: 61)	VTVSS	NO: 15)

Ab642	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KGLEWMG	(SEQ ID NO: 20)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQDRVTITR DRSMSTAYMELRS LRSEDTAMYYC	(SEQ ID NO: 24)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGTT VTVSS	(SEQ ID NO: 15)
Ab643	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KGLEWMG	(SEQ ID NO: 20)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQDRVTITR DRSMSTAYMELSS LRSEDTAVYYC	(SEQ ID NO: 25)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGTT VTVSS	(SEQ ID NO: 15)
Ab644	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KGLEWMG	(SEQ ID NO: 20)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSTSTAYMELSS LRSEDTAMYYC	(SEQ ID NO: 26)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGTT VTVSS	(SEQ ID NO: 15)
Ab645	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KGLEWMG	(SEQ ID NO: 20)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSMSTAYMELRS LRSEDTAMYYC	(SEQ ID NO: 27)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGTT VTVSS	(SEQ ID NO: 15)
Ab646	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KGLEWMG	(SEQ ID NO: 20)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSMSTAYMELSS LRSEDTAVYYC	(SEQ ID NO: 28)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGTT VTVSS	(SEQ ID NO: 15)
Ab647	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KGLEWMG	(SEQ ID NO: 20)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQDRVTITR DRSTSTAYMELRS LRSEDTAMYYC	(SEQ ID NO: 29)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGTT VTVSS	(SEQ ID NO: 15)
Ab648	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KGLEWMG	(SEQ ID NO: 20)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQDRVTITR DRSTSTAYMELSS LRSEDTAVYYC	(SEQ ID NO: 30)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGTT VTVSS	(SEQ ID NO: 15)
Ab649	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KGLEWMG	(SEQ ID NO: 20)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQDRVTITR DRSMSTAYMELRS LRSEDTAVYYC	(SEQ ID NO: 31)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGTT VTVSS	(SEQ ID NO: 15)
Ab650	X _{H1} QMLVQS GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KGLEWMG	(SEQ ID NO: 20)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSTSTAYMELSS	(SEQ ID NO: 26)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGTT VTVSS	(SEQ ID NO: 15)

[illegible]

	GAEVKKTGS SVKVSCKAS	NO: 12)	YYLH	NO: 59)	KGLEWMG	NO: 20)	GDTE	NO: 60)	DRSTSTAYMELRS LRSEDNAVYYC	NO: 35)	SYPMDY	NO: 61)	VTVSS	NO: 15)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 20)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELRS	(SEQ ID NO: 32)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 15)
Ab660	SVKVSCKAS	NO: 21)	YYLH	NO: 59)	KGLEWMG	NO: 20)	GDTE	NO: 60)	LRSEDNAVYYC	NO: 33)	SYPMDY	NO: 61)	VTVSS	NO: 15)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 20)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELRS	(SEQ ID NO: 34)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 15)
Ab661	SVKVSCKAS	NO: 21)	YYLH	NO: 59)	KGLEWMG	NO: 20)	GDTE	NO: 60)	LRSEDNAVYYC	NO: 35)	SYPMDY	NO: 61)	VTVSS	NO: 15)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 20)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELRS	(SEQ ID NO: 36)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 15)
Ab662	SVKVSCKAS	NO: 21)	YYLH	NO: 59)	KGLEWMG	NO: 20)	GDTE	NO: 60)	LRSEDNAVYYC	NO: 37)	SYPMDY	NO: 61)	VTVSS	NO: 15)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 20)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELRS	(SEQ ID NO: 38)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 15)
Ab663	SVKVSCKAS	NO: 21)	YYLH	NO: 59)	KGLEWMG	NO: 20)	GDTE	NO: 60)	LRSEDNAVYYC	NO: 39)	SYPMDY	NO: 61)	VTVSS	NO: 15)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 20)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELRS	(SEQ ID NO: 40)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 15)
Ab664	SVKVSCKAS	NO: 21)	YYLH	NO: 59)	KGLEWMG	NO: 20)	GDTE	NO: 60)	LRSEDNAVYYC	NO: 41)	SYPMDY	NO: 61)	VTVSS	NO: 15)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 20)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELRS	(SEQ ID NO: 42)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 15)
Ab665	SVKVSCKAS	NO: 21)	YYLH	NO: 59)	KGLEWMG	NO: 20)	GDTE	NO: 60)	LRSEDNAVYYC	NO: 43)	SYPMDY	NO: 61)	VTVSS	NO: 15)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 20)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELRS	(SEQ ID NO: 44)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 15)
Ab666	SVKVSCKAS	NO: 21)	YYLH	NO: 59)	KALEWMG	NO: 13)	GDTE	NO: 60)	LRAEDTAMYYC	NO: 18)	SYPMDY	NO: 61)	VTVSS	NO: 15)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 13)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELSS	(SEQ ID NO: 37)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 15)
Ab667	SVKVSCKAS	NO: 12)	YYLH	NO: 59)	KALEWMG	NO: 13)	GDTE	NO: 60)	LRAEDTAMYYC	NO: 38)	SYPMDY	NO: 61)	VTVSS	NO: 15)

Ab668	X _{H1} QMLVQS GAEVKKTGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KALEWMG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQDRVTITR DRSTSTAYMELSS LRAEDTAMYYC	(SEQ ID NO: 38)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTSS	(SEQ ID NO: 15)
Ab669	X _{H1} QMLVQS GAEVKKTGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KALEWMG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQDRVTITR DRSMSTAYMELRS LRAEDTAMYYC	(SEQ ID NO: 39)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTSS	(SEQ ID NO: 15)
Ab670	X _{H1} QMLVQS GAEVKKTGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KALEWMG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQDRVTITR DRSMSTAYMELSS LRAEDTAVYYC	(SEQ ID NO: 40)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTSS	(SEQ ID NO: 15)
Ab671	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KALEWMG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSMSTAYMELSS LRAEDTAMYYC	(SEQ ID NO: 37)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTSS	(SEQ ID NO: 15)
Ab672	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KALEWMG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQDRVTITR DRSTSTAYMELSS LRAEDTAMYYC	(SEQ ID NO: 38)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTSS	(SEQ ID NO: 15)
Ab673	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KALEWMG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQDRVTITR DRSMSTAYMELRS LRAEDTAMYYC	(SEQ ID NO: 39)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTSS	(SEQ ID NO: 15)
Ab674	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KALEWMG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQDRVTITR DRSMSTAYMELSS LRAEDTAVYYC	(SEQ ID NO: 40)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTSS	(SEQ ID NO: 15)
Ab675	X _{H1} QMLVQS GAEVKKTGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KALEWMG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSTSTAYMELSS LRAEDTAMYYC	(SEQ ID NO: 41)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTSS	(SEQ ID NO: 15)
Ab676	X _{H1} QMLVQS GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KALEWMG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSMSTAYMELRS	(SEQ ID NO: 42)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTSS	(SEQ ID NO: 15)

[illegible]

	GAEVKKPGS SVKVSCKAS	NO: 21)	YYLH	NO: 59)	KALEWMG	NO: 13)	GDTE	NO: 60)	DRSTSTAYMELSS LRAEDTAVYYC	NO: 45)	SYPMDY	NO: 61)	VTVSS	NO: 15)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
Ab686	GAEVKKPGS SVKVSCKAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	DRSMSTAYMELRS LRAEDTAVYYC	(SEQ ID NO: 46)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 15)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
Ab687	GAEVKKPGS SVKVSCKAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	DRSTSTAYMELRS LRAEDTAMYYC	(SEQ ID NO: 47)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 15)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
Ab688	GAEVKKPGS SVKVSCKAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	DRSTSTAYMELSS LRAEDTAVYYC	(SEQ ID NO: 48)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 15)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
Ab689	GAEVKKPGS SVKVSCKAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	DRSMSTAYMELRS LRAEDTAVYYC	(SEQ ID NO: 49)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 15)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
Ab690	GAEVKKPGS SVKVSCKAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	DRSTSTAYMELRS LRAEDTAVYYC	(SEQ ID NO: 50)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 15)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
Ab691	GAEVKKPGS SVKVSCKAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	DRSTSTAYMELRS LRAEDTAMYYC	(SEQ ID NO: 47)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 15)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
Ab692	GAEVKKPGS SVKVSCKAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	DRSTSTAYMELSS LRAEDTAVYYC	(SEQ ID NO: 48)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 15)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
Ab693	GAEVKKPGS SVKVSCKAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	DRSMSTAYMELRS LRAEDTAVYYC	(SEQ ID NO: 49)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 15)

Ab694	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KALEWMG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	YQKFQDRVTITR DRSTSTAYMELRS LRAEDTAVYYC	(SEQ ID NO: 50)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 15)
Ab695	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KALEWMG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	YQKFQGRVTITR DRSTSTAYMELRS LRAEDTAVYYC	(SEQ ID NO: 139)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 15)
Ab696	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KALEWMG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	YQKFQGRVTITR DRSTSTAYMELRS LRAEDTAVYYC	(SEQ ID NO: 139)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 15)
Ab697	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KALEWMG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	YQKFQDRVTITR DRSMSTAYMELSS LRSEDAMYYC	(SEQ ID NO: 14)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 19)
Ab698	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KALEWMG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	YQKFQGRVTITR DRSMSTAYMELSS LRSEDAMYYC	(SEQ ID NO: 22)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 19)
Ab699	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KALEWMG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	YQKFQDRVTITR DRSTSTAYMELSS LRSEDAMYYC	(SEQ ID NO: 23)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 19)
Ab700	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KALEWMG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	YQKFQDRVTITR DRSMSTAYMELRS LRSEDAMYYC	(SEQ ID NO: 24)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 19)
Ab701	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KALEWMG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	YQKFQDRVTITR DRSMSTAYMELSS LRSEDAMYYC	(SEQ ID NO: 25)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 19)
Ab702	X _{H1} QMLVQS GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KALEWMG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	YQKFQGRVTITR DRSMSTAYMELSS	(SEQ ID NO: 22)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 19)

	SVKVSCKAS									LRSEDAMYYC							(SEQ ID NO: 60)	(SEQ ID NO: 60)	DRSTSTAYMELSS	(SEQ ID NO: 23)	NAAYGSS	(SEQ ID NO: 61)	WGQGTL	(SEQ ID NO: 19)
Ab703	X _{H1} QMQLVQS GAEVKKPGS	GFSNID	YVLH	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 13)	WIDPDQ	GDTE		YAQKFQDRVTITR									DRSTSTAYMELSS	(SEQ ID NO: 24)	SYPMDY	(SEQ ID NO: 61)	VTVSS	(SEQ ID NO: 19)
Ab704	X _{H1} QMQLVQS GAEVKKPGS	GFSNID	YVLH	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 13)	WIDPDQ	GDTE		YAQKFQDRVTITR									DRSMSTAYMELRS	(SEQ ID NO: 25)	SYPMDY	(SEQ ID NO: 61)	VTVSS	(SEQ ID NO: 19)
Ab705	X _{H1} QMQLVQS GAEVKKPGS	GFSNID	YVLH	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 13)	WIDPDQ	GDTE		YAQKFQGRVTITR									DRSMSTAYMELSS	(SEQ ID NO: 26)	SYPMDY	(SEQ ID NO: 61)	VTVSS	(SEQ ID NO: 19)
Ab706	X _{H1} QMQLVQS GAEVKKTGS	GFSNID	YVLH	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 13)	WIDPDQ	GDTE		YAQKFQGRVTITR									DRSTSTAYMELSS	(SEQ ID NO: 27)	SYPMDY	(SEQ ID NO: 61)	VTVSS	(SEQ ID NO: 19)
Ab707	X _{H1} QMQLVQS GAEVKKKTGS	GFSNID	YVLH	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 13)	WIDPDQ	GDTE		YAQKFQGRVTITR									DRSMSTAYMELRS	(SEQ ID NO: 28)	SYPMDY	(SEQ ID NO: 61)	VTVSS	(SEQ ID NO: 19)
Ab708	X _{H1} QMQLVQS GAEVKKKTGS	GFSNID	YVLH	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 13)	WIDPDQ	GDTE		YAQKFQGRVTITR									DRSMSTAYMELSS	(SEQ ID NO: 29)	SYPMDY	(SEQ ID NO: 61)	VTVSS	(SEQ ID NO: 19)
Ab709	X _{H1} QMQLVQS GAEVKKKTGS	GFSNID	YVLH	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 13)	WIDPDQ	GDTE		YAQKFQDRVTITR									DRSTSTAYMELRS	(SEQ ID NO: 30)	SYPMDY	(SEQ ID NO: 61)	VTVSS	(SEQ ID NO: 19)
Ab710	X _{H1} QMQLVQS GAEVKKKTGS	GFSNID	YVLH	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 13)	WIDPDQ	GDTE		YAQKFQDRVTITR									DRSTSTAYMELSS	(SEQ ID NO: 31)	SYPMDY	(SEQ ID NO: 61)	VTVSS	(SEQ ID NO: 19)
Ab711	X _{H1} QMQLVQS GAEVKKKTGS	GFSNID	YVLH	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 13)	WIDPDQ	GDTE		YAQKFQDRVTITR									DRSTSTAYMELSS	(SEQ ID NO: 32)	SYPMDY	(SEQ ID NO: 61)	VTVSS	(SEQ ID NO: 19)

	GAEVKKTGS SVKVSCKAS	NO: 12)	YYLH	NO: 59)	KALEWMG	NO: 13)	GDTE	NO: 60)	DRSMSTAYMELRS LRSEDTAVYYC	NO: 31)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 13)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELSS	(SEQ ID NO: 26)	NAAYGSS	(SEQ ID NO: 61)	WGQGTGTL	(SEQ ID NO: 19)
Ab712	SVKVSCKAS	NO: 21)	YYLH	NO: 59)	KALEWMG	NO: 13)	GDTE	NO: 60)	LRSEDTAMYYC	NO: 26)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 13)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELRS	(SEQ ID NO: 27)	NAAYGSS	(SEQ ID NO: 61)	WGQGTGTL	(SEQ ID NO: 19)
Ab713	SVKVSCKAS	NO: 21)	YYLH	NO: 59)	KALEWMG	NO: 13)	GDTE	NO: 60)	LRSEDTAMYYC	NO: 27)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 13)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELSS	(SEQ ID NO: 28)	NAAYGSS	(SEQ ID NO: 61)	WGQGTGTL	(SEQ ID NO: 19)
Ab714	SVKVSCKAS	NO: 21)	YYLH	NO: 59)	KALEWMG	NO: 13)	GDTE	NO: 60)	LRSEDTAVYYC	NO: 28)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 13)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELRS	(SEQ ID NO: 29)	NAAYGSS	(SEQ ID NO: 61)	WGQGTGTL	(SEQ ID NO: 19)
Ab715	SVKVSCKAS	NO: 21)	YYLH	NO: 59)	KALEWMG	NO: 13)	GDTE	NO: 60)	LRSEDTAMYYC	NO: 29)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 13)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELSS	(SEQ ID NO: 30)	NAAYGSS	(SEQ ID NO: 61)	WGQGTGTL	(SEQ ID NO: 19)
Ab716	SVKVSCKAS	NO: 21)	YYLH	NO: 59)	KALEWMG	NO: 13)	GDTE	NO: 60)	LRSEDTAVYYC	NO: 30)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 13)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELRS	(SEQ ID NO: 31)	NAAYGSS	(SEQ ID NO: 61)	WGQGTGTL	(SEQ ID NO: 19)
Ab717	SVKVSCKAS	NO: 21)	YYLH	NO: 59)	KALEWMG	NO: 13)	GDTE	NO: 60)	LRSEDTAVYYC	NO: 31)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 13)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELRS	(SEQ ID NO: 32)	NAAYGSS	(SEQ ID NO: 61)	WGQGTGTL	(SEQ ID NO: 19)
Ab718	SVKVSCKAS	NO: 12)	YYLH	NO: 59)	KALEWMG	NO: 13)	GDTE	NO: 60)	LRSEDTAMYYC	NO: 32)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 13)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELSS	(SEQ ID NO: 33)	NAAYGSS	(SEQ ID NO: 61)	WGQGTGTL	(SEQ ID NO: 19)
Ab719	SVKVSCKAS	NO: 12)	YYLH	NO: 59)	KALEWMG	NO: 13)	GDTE	NO: 60)	LRSEDTAVYYC	NO: 33)	SYPMDY	NO: 61)	VTVSS	NO: 19)

Ab720	X _{H1} QMLVQS GAEVKKTGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KALEWMG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSMSTAYMELRS LRSEDTAVYYC	(SEQ ID NO: 34)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 19)
Ab721	X _{H1} QMLVQS GAEVKKTGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KALEWMG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSTSTAYMELRS LRSEDTAVYYC	(SEQ ID NO: 35)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 19)
Ab722	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KALEWMG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSTSTAYMELRS LRSEDTAMYYC	(SEQ ID NO: 32)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 19)
Ab723	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KALEWMG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSTSTAYMELSS LRSEDTAVYYC	(SEQ ID NO: 33)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 19)
Ab724	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KALEWMG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSMSTAYMELRS LRSEDTAVYYC	(SEQ ID NO: 34)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 19)
Ab725	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KALEWMG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSTSTAYMELRS LRSEDTAVYYC	(SEQ ID NO: 35)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 19)
Ab726	X _{H1} QMLVQS GAEVKKTGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KALEWMG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSTSTAYMELRS LRSEDTAVYYC	(SEQ ID NO: 36)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 19)
Ab727	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KALEWMG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSTSTAYMELRS LRSEDTAVYYC	(SEQ ID NO: 36)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 19)
Ab728	X _{H1} QMLVQS GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QGLEWMG	(SEQ ID NO: 16)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSMSTAYMELSS	(SEQ ID NO: 18)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 15)

[illegible]

	GAEVKKTGS SVKVSCKAS	NO: 12)	YYLH	NO: 59)	QGLEWMG	NO: 16)	GDTE	NO: 60)	DRSTSTAYMELSS LRAEDTAMYYC	NO: 41)	SYPMDY	NO: 61)	VTVSS	NO: 15)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 16)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELRS	(SEQ ID NO: 42)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 15)
Ab738	SVKVSCKAS	NO: 12)	YYLH	NO: 59)	QGLEWMG	NO: 16)	GDTE	NO: 60)	LRAEDTAMYYC	NO: 43)	SYPMDY	NO: 61)	VTVSS	NO: 15)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 16)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELSS	(SEQ ID NO: 43)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 15)
Ab739	SVKVSCKAS	NO: 12)	YYLH	NO: 59)	QGLEWMG	NO: 16)	GDTE	NO: 60)	LRAEDTAVYYC	NO: 44)	SYPMDY	NO: 61)	VTVSS	NO: 15)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 16)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELRS	(SEQ ID NO: 44)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 15)
Ab740	SVKVSCKAS	NO: 12)	YYLH	NO: 59)	QGLEWMG	NO: 16)	GDTE	NO: 60)	LRAEDTAMYYC	NO: 45)	SYPMDY	NO: 61)	VTVSS	NO: 15)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 16)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELSS	(SEQ ID NO: 45)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 15)
Ab741	SVKVSCKAS	NO: 12)	YYLH	NO: 59)	QGLEWMG	NO: 16)	GDTE	NO: 60)	LRAEDTAVYYC	NO: 46)	SYPMDY	NO: 61)	VTVSS	NO: 15)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 16)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELRS	(SEQ ID NO: 46)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 15)
Ab742	SVKVSCKAS	NO: 12)	YYLH	NO: 59)	QGLEWMG	NO: 16)	GDTE	NO: 60)	LRAEDTAVYYC	NO: 47)	SYPMDY	NO: 61)	VTVSS	NO: 15)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 16)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELSS	(SEQ ID NO: 47)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 15)
Ab743	SVKVSCKAS	NO: 21)	YYLH	NO: 59)	QGLEWMG	NO: 16)	GDTE	NO: 60)	LRAEDTAMYYC	NO: 48)	SYPMDY	NO: 61)	VTVSS	NO: 15)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 16)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELRS	(SEQ ID NO: 48)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 15)
Ab744	SVKVSCKAS	NO: 21)	YYLH	NO: 59)	QGLEWMG	NO: 16)	GDTE	NO: 60)	LRAEDTAMYYC	NO: 49)	SYPMDY	NO: 61)	VTVSS	NO: 15)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 16)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELSS	(SEQ ID NO: 49)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 15)
Ab745	SVKVSCKAS	NO: 21)	YYLH	NO: 59)	QGLEWMG	NO: 16)	GDTE	NO: 60)	LRAEDTAVYYC	NO: 50)	SYPMDY	NO: 61)	VTVSS	NO: 15)

Ab746	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QGLEWMG	(SEQ ID NO: 16)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQDRVTITR DRSTSTAYMELRS LRAEDTAMYYC	(SEQ ID NO: 44)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGTT VTVSS	(SEQ ID NO: 15)
Ab747	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QGLEWMG	(SEQ ID NO: 16)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQDRVTITR DRSTSTAYMELSS LRAEDTAVYYC	(SEQ ID NO: 45)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGTT VTVSS	(SEQ ID NO: 15)
Ab748	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QGLEWMG	(SEQ ID NO: 16)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQDRVTITR DRSMSTAYMELRS LRAEDTAVYYC	(SEQ ID NO: 46)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGTT VTVSS	(SEQ ID NO: 15)
Ab749	X _{H1} QMLVQS GAEVKKTGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QGLEWMG	(SEQ ID NO: 16)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSTSTAYMELRS LRAEDTAMYYC	(SEQ ID NO: 47)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGTT VTVSS	(SEQ ID NO: 15)
Ab750	X _{H1} QMLVQS GAEVKKTGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QGLEWMG	(SEQ ID NO: 16)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSTSTAYMELSS LRAEDTAVYYC	(SEQ ID NO: 48)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGTT VTVSS	(SEQ ID NO: 15)
Ab751	X _{H1} QMLVQS GAEVKKTGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QGLEWMG	(SEQ ID NO: 16)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSMSTAYMELRS LRAEDTAVYYC	(SEQ ID NO: 49)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGTT VTVSS	(SEQ ID NO: 15)
Ab752	X _{H1} QMLVQS GAEVKKTGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QGLEWMG	(SEQ ID NO: 16)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQDRVTITR DRSTSTAYMELRS LRAEDTAVYYC	(SEQ ID NO: 50)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGTT VTVSS	(SEQ ID NO: 15)
Ab753	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QGLEWMG	(SEQ ID NO: 16)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSTSTAYMELRS LRAEDTAMYYC	(SEQ ID NO: 47)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGTT VTVSS	(SEQ ID NO: 15)
Ab754	X _{H1} QMLVQS GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QGLEWMG	(SEQ ID NO: 16)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSTSTAYMELSS	(SEQ ID NO: 48)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGTT VTVSS	(SEQ ID NO: 15)

[illegible]

	GAEVKKTGS SVKVSCKAS	NO: 12)	YYLH	NO: 59)	QGLEWMG	NO: 16)	GDTE	NO: 60)	DRSMSTAYMELSS LRSEDTAVYYC	NO: 25)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 16)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELSS	(SEQ ID NO: 22)	NAAYGSS	(SEQ ID NO: 61)	WGQGTGTL	(SEQ ID NO: 19)
Ab764	SVKVSCKAS						GDTE		LRSEDTAMYYC	NO: 23)	SYPMDY		VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 16)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELSS	(SEQ ID NO: 24)	NAAYGSS	(SEQ ID NO: 61)	WGQGTGTL	(SEQ ID NO: 19)
Ab765	SVKVSCKAS						GDTE		LRSEDTAMYYC	NO: 25)	SYPMDY		VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 16)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELSS	(SEQ ID NO: 26)	NAAYGSS	(SEQ ID NO: 61)	WGQGTGTL	(SEQ ID NO: 19)
Ab766	SVKVSCKAS						GDTE		LRSEDTAMYYC	NO: 27)	SYPMDY		VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 16)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELSS	(SEQ ID NO: 28)	NAAYGSS	(SEQ ID NO: 61)	WGQGTGTL	(SEQ ID NO: 19)
Ab767	SVKVSCKAS						GDTE		LRSEDTAMYYC	NO: 29)	SYPMDY		VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 16)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELSS	(SEQ ID NO: 30)	NAAYGSS	(SEQ ID NO: 61)	WGQGTGTL	(SEQ ID NO: 19)
Ab768	SVKVSCKAS						GDTE		LRSEDTAMYYC	NO: 31)	SYPMDY		VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 16)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELSS	(SEQ ID NO: 32)	NAAYGSS	(SEQ ID NO: 61)	WGQGTGTL	(SEQ ID NO: 19)
Ab769	SVKVSCKAS						GDTE		LRSEDTAMYYC	NO: 33)	SYPMDY		VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 16)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELSS	(SEQ ID NO: 34)	NAAYGSS	(SEQ ID NO: 61)	WGQGTGTL	(SEQ ID NO: 19)
Ab770	SVKVSCKAS						GDTE		LRSEDTAMYYC	NO: 35)	SYPMDY		VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 16)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELSS	(SEQ ID NO: 36)	NAAYGSS	(SEQ ID NO: 61)	WGQGTGTL	(SEQ ID NO: 19)
Ab771	SVKVSCKAS						GDTE		LRSEDTAMYYC	NO: 37)	SYPMDY		VTVSS	NO: 19)

Ab772	X _{H1} QMLVQS GAEVKKTGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QGLEWMG	(SEQ ID NO: 16)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQDRVTITR DRSTSTAYMELSS LRSEDTAVYYC	(SEQ ID NO: 30)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)
Ab773	X _{H1} QMLVQS GAEVKKTGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QGLEWMG	(SEQ ID NO: 16)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQDRVTITR DRSMSTAYMELRS LRSEDTAVYYC	(SEQ ID NO: 31)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)
Ab774	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QGLEWMG	(SEQ ID NO: 16)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSTSTAYMELSS LRSEDTAMYYC	(SEQ ID NO: 26)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)
Ab775	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QGLEWMG	(SEQ ID NO: 16)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSMSTAYMELRS LRSEDTAMYYC	(SEQ ID NO: 27)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)
Ab776	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QGLEWMG	(SEQ ID NO: 16)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSMSTAYMELSS LRSEDTAVYYC	(SEQ ID NO: 28)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)
Ab777	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QGLEWMG	(SEQ ID NO: 16)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQDRVTITR DRSTSTAYMELRS LRSEDTAMYYC	(SEQ ID NO: 29)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)
Ab778	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QGLEWMG	(SEQ ID NO: 16)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQDRVTITR DRSTSTAYMELSS LRSEDTAVYYC	(SEQ ID NO: 30)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)
Ab779	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QGLEWMG	(SEQ ID NO: 16)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQDRVTITR DRSMSTAYMELRS LRSEDTAVYYC	(SEQ ID NO: 31)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)
Ab780	X _{H1} QMLVQS GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QGLEWMG	(SEQ ID NO: 16)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSTSTAYMELRS	(SEQ ID NO: 32)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)

[illegible]

	GAEVKKPGS SVKVSCKAS	NO: 21)	YYLH	NO: 59)	QGLEWMG	NO: 16)	GDTE	NO: 60)	DRSTSTAYMELRS LRSEDТАVYYC	NO: 36)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 17)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELSS	(SEQ ID NO: 18)	NAAYGSS	(SEQ ID NO: 61)	WGQGTЛ	(SEQ ID NO: 19)
Ab790	SVKVSCKAS	NO: 21)	YYLH	NO: 59)	QALEWMG	NO: 17)	GDTE	NO: 60)	LRAEDTAMYYC	NO: 37)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 17)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELSS	(SEQ ID NO: 37)	NAAYGSS	(SEQ ID NO: 61)	WGQGTЛ	(SEQ ID NO: 19)
Ab791	SVKVSCKAS	NO: 12)	YYLH	NO: 59)	QALEWMG	NO: 17)	GDTE	NO: 60)	LRAEDTAMYYC	NO: 37)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 17)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELSS	(SEQ ID NO: 38)	NAAYGSS	(SEQ ID NO: 61)	WGQGTЛ	(SEQ ID NO: 19)
Ab792	SVKVSCKAS	NO: 12)	YYLH	NO: 59)	QALEWMG	NO: 17)	GDTE	NO: 60)	LRAEDTAMYYC	NO: 38)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 17)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELRS	(SEQ ID NO: 39)	NAAYGSS	(SEQ ID NO: 61)	WGQGTЛ	(SEQ ID NO: 19)
Ab793	SVKVSCKAS	NO: 12)	YYLH	NO: 59)	QALEWMG	NO: 17)	GDTE	NO: 60)	LRAEDTAMYYC	NO: 39)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 17)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELSS	(SEQ ID NO: 40)	NAAYGSS	(SEQ ID NO: 61)	WGQGTЛ	(SEQ ID NO: 19)
Ab794	SVKVSCKAS	NO: 12)	YYLH	NO: 59)	QALEWMG	NO: 17)	GDTE	NO: 60)	LRAEDTAMYYC	NO: 40)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 17)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELSS	(SEQ ID NO: 37)	NAAYGSS	(SEQ ID NO: 61)	WGQGTЛ	(SEQ ID NO: 19)
Ab795	SVKVSCKAS	NO: 21)	YYLH	NO: 59)	QALEWMG	NO: 17)	GDTE	NO: 60)	LRAEDTAMYYC	NO: 37)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 17)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELSS	(SEQ ID NO: 38)	NAAYGSS	(SEQ ID NO: 61)	WGQGTЛ	(SEQ ID NO: 19)
Ab796	SVKVSCKAS	NO: 21)	YYLH	NO: 59)	QALEWMG	NO: 17)	GDTE	NO: 60)	LRAEDTAMYYC	NO: 38)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 17)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELRS	(SEQ ID NO: 39)	NAAYGSS	(SEQ ID NO: 61)	WGQGTЛ	(SEQ ID NO: 19)
Ab797	SVKVSCKAS	NO: 21)	YYLH	NO: 59)	QALEWMG	NO: 17)	GDTE	NO: 60)	LRAEDTAMYYC	NO: 39)	SYPMDY	NO: 61)	VTVSS	NO: 19)

Ab798	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QALEWMG	(SEQ ID NO: 17)	WIDPDQ GDTE	(SEQ ID NO: 60)	YQKFKQDRVTITR DRSMSTAYMELSS LRAEDTAVYYC	(SEQ ID NO: 40)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)
Ab799	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QALEWMG	(SEQ ID NO: 17)	WIDPDQ GDTE	(SEQ ID NO: 60)	YQKFKQGRVTITR DRSTSTAYMELSS LRAEDTAMYYC	(SEQ ID NO: 41)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)
Ab800	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QALEWMG	(SEQ ID NO: 17)	WIDPDQ GDTE	(SEQ ID NO: 60)	YQKFKQGRVTITR DRSMSTAYMELRS LRAEDTAMYYC	(SEQ ID NO: 42)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)
Ab801	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QALEWMG	(SEQ ID NO: 17)	WIDPDQ GDTE	(SEQ ID NO: 60)	YQKFKQGRVTITR DRSMSTAYMELSS LRAEDTAVYYC	(SEQ ID NO: 43)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)
Ab802	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QALEWMG	(SEQ ID NO: 17)	WIDPDQ GDTE	(SEQ ID NO: 60)	YQKFKQDRVTITR DRSTSTAYMELRS LRAEDTAMYYC	(SEQ ID NO: 44)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)
Ab803	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QALEWMG	(SEQ ID NO: 17)	WIDPDQ GDTE	(SEQ ID NO: 60)	YQKFKQDRVTITR DRSTSTAYMELSS LRAEDTAVYYC	(SEQ ID NO: 45)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)
Ab804	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QALEWMG	(SEQ ID NO: 17)	WIDPDQ GDTE	(SEQ ID NO: 60)	YQKFKQDRVTITR DRSMSTAYMELRS LRAEDTAVYYC	(SEQ ID NO: 46)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)
Ab805	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QALEWMG	(SEQ ID NO: 17)	WIDPDQ GDTE	(SEQ ID NO: 60)	YQKFKQGRVTITR DRSTSTAYMELSS LRAEDTAMYYC	(SEQ ID NO: 41)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)
Ab806	X _{H1} QMLVQS GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QALEWMG	(SEQ ID NO: 17)	WIDPDQ GDTE	(SEQ ID NO: 60)	YQKFKQGRVTITR DRSMSTAYMELRS	(SEQ ID NO: 42)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)

	GAEVKKPGS SVKVSCKAS	NO: 21)	YYLH	NO: 59)	QALEWMG	NO: 17)	GDTE	NO: 60)	DRSTSTAYMELRS LRAEDTAMYYC	NO: 47)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 17)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELSS	(SEQ ID NO: 48)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 19)
Ab816	SVKVSCKAS	NO: 21)	YYLH	NO: 59)	QALEWMG	NO: 17)	GDTE	NO: 60)	LRAEDTAVYYC	NO: 48)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 17)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELRS	(SEQ ID NO: 49)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 19)
Ab817	SVKVSCKAS	NO: 21)	YYLH	NO: 59)	QALEWMG	NO: 17)	GDTE	NO: 60)	LRAEDTAVYYC	NO: 49)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 17)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELRS	(SEQ ID NO: 50)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 19)
Ab818	SVKVSCKAS	NO: 21)	YYLH	NO: 59)	QALEWMG	NO: 17)	GDTE	NO: 60)	LRAEDTAVYYC	NO: 50)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKPGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 17)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELRS	(SEQ ID NO: 139)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 19)
Ab819	SVKVSCKAS	NO: 12)	YYLH	NO: 59)	QALEWMG	NO: 17)	GDTE	NO: 60)	LRAEDTAVYYC	NO: 139)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 17)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELRS	(SEQ ID NO: 139)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 19)
Ab820	SVKVSCKAS	NO: 21)	YYLH	NO: 59)	QALEWMG	NO: 17)	GDTE	NO: 60)	LRAEDTAVYYC	NO: 139)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 20)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELSS	(SEQ ID NO: 18)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 15)
Ab821	SVKVSCKAS	NO: 21)	YYLH	NO: 59)	KGLEWMG	NO: 20)	GDTE	NO: 60)	LRAEDTAMYYC	NO: 18)	SYPMDY	NO: 61)	VTVSS	NO: 15)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKPGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 20)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELSS	(SEQ ID NO: 37)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 15)
Ab822	SVKVSCKAS	NO: 12)	YYLH	NO: 59)	KGLEWMG	NO: 20)	GDTE	NO: 60)	LRAEDTAMYYC	NO: 37)	SYPMDY	NO: 61)	VTVSS	NO: 15)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
	GAEVKKPGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 20)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELSS	(SEQ ID NO: 38)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 15)
Ab823	SVKVSCKAS	NO: 12)	YYLH	NO: 59)	KGLEWMG	NO: 20)	GDTE	NO: 60)	LRAEDTAMYYC	NO: 38)	SYPMDY	NO: 61)	VTVSS	NO: 15)

Ab824	X _{H1} QMLVQS GAEVKKTGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KGLEWMG	(SEQ ID NO: 20)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQDRVTITR DRSMSTAYMELRS LRAEDTAMYYC	(SEQ ID NO: 39)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 15)
Ab825	X _{H1} QMLVQS GAEVKKTGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KGLEWMG	(SEQ ID NO: 20)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQDRVTITR DRSMSTAYMELSS LRAEDTAVYYC	(SEQ ID NO: 40)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 15)
Ab826	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KGLEWMG	(SEQ ID NO: 20)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSMSTAYMELSS LRAEDTAMYYC	(SEQ ID NO: 37)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 15)
Ab827	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KGLEWMG	(SEQ ID NO: 20)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQDRVTITR DRSTSTAYMELSS LRAEDTAMYYC	(SEQ ID NO: 38)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 15)
Ab828	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KGLEWMG	(SEQ ID NO: 20)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQDRVTITR DRSMSTAYMELRS LRAEDTAMYYC	(SEQ ID NO: 39)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 15)
Ab829	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KGLEWMG	(SEQ ID NO: 20)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQDRVTITR DRSMSTAYMELSS LRAEDTAVYYC	(SEQ ID NO: 40)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 15)
Ab830	X _{H1} QMLVQS GAEVKKTGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KGLEWMG	(SEQ ID NO: 20)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSTSTAYMELSS LRAEDTAMYYC	(SEQ ID NO: 41)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 15)
Ab831	X _{H1} QMLVQS GAEVKKTGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KGLEWMG	(SEQ ID NO: 20)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSMSTAYMELRS LRAEDTAMYYC	(SEQ ID NO: 42)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 15)
Ab832	X _{H1} QMLVQS GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KGLEWMG	(SEQ ID NO: 20)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSMSTAYMELSS	(SEQ ID NO: 43)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 15)

	SVKVSCKAS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
--	-----------	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

	GAEVKKPGS SVKVSCKAS	NO: 21)	YYLH	NO: 59)	KGLEWMG	NO: 20)	GDTE	NO: 60)	DRSMSTAYMELRS LRAEDTAVYYC	NO: 46)	SYPMDY	NO: 61)	VTVSS	NO: 15)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 20)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELRS	(SEQ ID NO: 47)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 15)
Ab842	SVKVSCKAS	NO: 12)	YYLH	NO: 59)	KGLEWMG	NO: 20)	GDTE	NO: 60)	LRAEDTAMYYC	NO: 47)	SYPMDY	NO: 61)	VTVSS	NO: 15)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 20)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELSS	(SEQ ID NO: 48)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 15)
Ab843	SVKVSCKAS	NO: 12)	YYLH	NO: 59)	KGLEWMG	NO: 20)	GDTE	NO: 60)	LRAEDTAVYYC	NO: 48)	SYPMDY	NO: 61)	VTVSS	NO: 15)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 20)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELRS	(SEQ ID NO: 49)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 15)
Ab844	SVKVSCKAS	NO: 12)	YYLH	NO: 59)	KGLEWMG	NO: 20)	GDTE	NO: 60)	LRAEDTAVYYC	NO: 49)	SYPMDY	NO: 61)	VTVSS	NO: 15)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 20)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELRS	(SEQ ID NO: 50)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 15)
Ab845	SVKVSCKAS	NO: 12)	YYLH	NO: 59)	KGLEWMG	NO: 20)	GDTE	NO: 60)	LRAEDTAVYYC	NO: 50)	SYPMDY	NO: 61)	VTVSS	NO: 15)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 20)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELRS	(SEQ ID NO: 47)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 15)
Ab846	SVKVSCKAS	NO: 21)	YYLH	NO: 59)	KGLEWMG	NO: 20)	GDTE	NO: 60)	LRAEDTAMYYC	NO: 47)	SYPMDY	NO: 61)	VTVSS	NO: 15)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 20)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELSS	(SEQ ID NO: 48)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 15)
Ab847	SVKVSCKAS	NO: 21)	YYLH	NO: 59)	KGLEWMG	NO: 20)	GDTE	NO: 60)	LRAEDTAVYYC	NO: 48)	SYPMDY	NO: 61)	VTVSS	NO: 15)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 20)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELRS	(SEQ ID NO: 49)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 15)
Ab848	SVKVSCKAS	NO: 21)	YYLH	NO: 59)	KGLEWMG	NO: 20)	GDTE	NO: 60)	LRAEDTAVYYC	NO: 49)	SYPMDY	NO: 61)	VTVSS	NO: 15)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 20)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELRS	(SEQ ID NO: 50)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 15)
Ab849	SVKVSCKAS	NO: 21)	YYLH	NO: 59)	KGLEWMG	NO: 20)	GDTE	NO: 60)	LRAEDTAVYYC	NO: 50)	SYPMDY	NO: 61)	VTVSS	NO: 15)

Ab850	X _{H1} QMLVQS GAEVKKTGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KGLEWMG	(SEQ ID NO: 20)	WIDPDQ GDTE	(SEQ ID NO: 60)	YQKFQGRVTITR DRSTSTAYMELRS LRAEDTAVYYC	(SEQ ID NO: 139)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 15)
Ab851	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KGLEWMG	(SEQ ID NO: 20)	WIDPDQ GDTE	(SEQ ID NO: 60)	YQKFQGRVTITR DRSTSTAYMELRS LRAEDTAVYYC	(SEQ ID NO: 139)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 15)
Ab852	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KGLEWMG	(SEQ ID NO: 20)	WIDPDQ GDTE	(SEQ ID NO: 60)	YQKFQGRVTITR DRSMSTAYMELSS LRSEDTAMYYC	(SEQ ID NO: 14)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 19)
Ab853	X _{H1} QMLVQS GAEVKKTGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KGLEWMG	(SEQ ID NO: 20)	WIDPDQ GDTE	(SEQ ID NO: 60)	YQKFQGRVTITR DRSMSTAYMELSS LRSEDTAMYYC	(SEQ ID NO: 22)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 19)
Ab854	X _{H1} QMLVQS GAEVKKTGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KGLEWMG	(SEQ ID NO: 20)	WIDPDQ GDTE	(SEQ ID NO: 60)	YQKFQGRVTITR DRSTSTAYMELSS LRSEDTAMYYC	(SEQ ID NO: 23)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 19)
Ab855	X _{H1} QMLVQS GAEVKKTGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KGLEWMG	(SEQ ID NO: 20)	WIDPDQ GDTE	(SEQ ID NO: 60)	YQKFQGRVTITR DRSMSTAYMELRS LRSEDTAMYYC	(SEQ ID NO: 24)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 19)
Ab856	X _{H1} QMLVQS GAEVKKTGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KGLEWMG	(SEQ ID NO: 20)	WIDPDQ GDTE	(SEQ ID NO: 60)	YQKFQGRVTITR DRSMSTAYMELSS LRSEDTAVYYC	(SEQ ID NO: 25)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 19)
Ab857	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KGLEWMG	(SEQ ID NO: 20)	WIDPDQ GDTE	(SEQ ID NO: 60)	YQKFQGRVTITR DRSMSTAYMELSS LRSEDTAMYYC	(SEQ ID NO: 22)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 19)
Ab858	X _{H1} QMLVQS GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KGLEWMG	(SEQ ID NO: 20)	WIDPDQ GDTE	(SEQ ID NO: 60)	YQKFQGRVTITR DRSTSTAYMELSS	(SEQ ID NO: 23)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 19)

[illegible]

	GAEVKKPGS SVKVSCKAS	NO: 21)	YYLH	NO: 59)	KGLEWMG	NO: 20)	GDTE	NO: 60)	DRSTSTAYMELSS LRSEDAMYYC	NO: 26)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 20)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELRS	(SEQ ID NO: 27)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 19)
Ab868	SVKVSCKAS	NO: 21)	YYLH	NO: 59)	KGLEWMG	NO: 20)	GDTE	NO: 60)	LRSEDAMYYC	NO: 27)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 20)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELSS	(SEQ ID NO: 28)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 19)
Ab869	SVKVSCKAS	NO: 21)	YYLH	NO: 59)	KGLEWMG	NO: 20)	GDTE	NO: 60)	LRSEDAMYYC	NO: 28)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 20)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELRS	(SEQ ID NO: 29)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 19)
Ab870	SVKVSCKAS	NO: 21)	YYLH	NO: 59)	KGLEWMG	NO: 20)	GDTE	NO: 60)	LRSEDAMYYC	NO: 29)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 20)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELSS	(SEQ ID NO: 30)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 19)
Ab871	SVKVSCKAS	NO: 21)	YYLH	NO: 59)	KGLEWMG	NO: 20)	GDTE	NO: 60)	LRSEDAMYYC	NO: 30)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 20)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELRS	(SEQ ID NO: 31)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 19)
Ab872	SVKVSCKAS	NO: 21)	YYLH	NO: 59)	KGLEWMG	NO: 20)	GDTE	NO: 60)	LRSEDAMYYC	NO: 31)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 20)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELRS	(SEQ ID NO: 32)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 19)
Ab873	SVKVSCKAS	NO: 12)	YYLH	NO: 59)	KGLEWMG	NO: 20)	GDTE	NO: 60)	LRSEDAMYYC	NO: 32)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 20)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELSS	(SEQ ID NO: 33)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 19)
Ab874	SVKVSCKAS	NO: 12)	YYLH	NO: 59)	KGLEWMG	NO: 20)	GDTE	NO: 60)	LRSEDAMYYC	NO: 33)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 20)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELRS	(SEQ ID NO: 34)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 19)
Ab875	SVKVSCKAS	NO: 12)	YYLH	NO: 59)	KGLEWMG	NO: 20)	GDTE	NO: 60)	LRSEDAMYYC	NO: 34)	SYPMDY	NO: 61)	VTVSS	NO: 19)

Ab876	X _{H1} QMLVQS GAEVKKTGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KGLEWMG	(SEQ ID NO: 20)	WIDPDQ GDTE	(SEQ ID NO: 60)	YQKFFQDRVTITR DRSTSTAYMELRS LRSEDTAVYYC	(SEQ ID NO: 35)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)
Ab877	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KGLEWMG	(SEQ ID NO: 20)	WIDPDQ GDTE	(SEQ ID NO: 60)	YQKFFQGRVTITR DRSTSTAYMELRS LRSEDTAMYYC	(SEQ ID NO: 32)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)
Ab878	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KGLEWMG	(SEQ ID NO: 20)	WIDPDQ GDTE	(SEQ ID NO: 60)	YQKFFQGRVTITR DRSTSTAYMELSS LRSEDTAVYYC	(SEQ ID NO: 33)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)
Ab879	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KGLEWMG	(SEQ ID NO: 20)	WIDPDQ GDTE	(SEQ ID NO: 60)	YQKFFQGRVTITR DRSMSTAYMELRS LRSEDTAVYYC	(SEQ ID NO: 34)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)
Ab880	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KGLEWMG	(SEQ ID NO: 20)	WIDPDQ GDTE	(SEQ ID NO: 60)	YQKFFQDRVTITR DRSTSTAYMELRS LRSEDTAVYYC	(SEQ ID NO: 35)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)
Ab881	X _{H1} QMLVQS GAEVKKTGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KGLEWMG	(SEQ ID NO: 20)	WIDPDQ GDTE	(SEQ ID NO: 60)	YQKFFQGRVTITR DRSTSTAYMELRS LRSEDTAVYYC	(SEQ ID NO: 36)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)
Ab882	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KGLEWMG	(SEQ ID NO: 20)	WIDPDQ GDTE	(SEQ ID NO: 60)	YQKFFQGRVTITR DRSTSTAYMELRS LRSEDTAVYYC	(SEQ ID NO: 36)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)
Ab883	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KALEWMG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	YQKFFQDRVTITR DRSMSTAYMELSS LRAEDTAMYYC	(SEQ ID NO: 18)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)
Ab884	X _{H1} QMLVQS GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KALEWMG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	YQKFFQGRVTITR DRSMSTAYMELSS	(SEQ ID NO: 37)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)

	GAEVKKTGS SVKVSCKAS	NO: 12)	YYLH	NO: 59)	KALEWMG	NO: 13)	GDTE	NO: 60)	DRSMSTAYMELRS LRAEDTAMYYC	NO: 42)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
Ab894	GAEVKKTGS SVKVSCKAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	DRSMSTAYMELSS LRAEDTAVYYC	(SEQ ID NO: 43)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 19)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
Ab895	GAEVKKTGS SVKVSCKAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	DRSTSTAYMELRS LRAEDTAMYYC	(SEQ ID NO: 44)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 19)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
Ab896	GAEVKKTGS SVKVSCKAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	DRSTSTAYMELSS LRAEDTAVYYC	(SEQ ID NO: 45)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 19)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
Ab897	GAEVKKTGS SVKVSCKAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	DRSMSTAYMELRS LRAEDTAVYYC	(SEQ ID NO: 46)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 19)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
Ab898	GAEVKKPGS SVKVSCKAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	DRSTSTAYMELSS LRAEDTAMYYC	(SEQ ID NO: 41)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 19)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
Ab899	GAEVKKPGS SVKVSCKAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	DRSMSTAYMELRS LRAEDTAMYYC	(SEQ ID NO: 42)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 19)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
Ab900	GAEVKKPGS SVKVSCKAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	DRSMSTAYMELSS LRAEDTAVYYC	(SEQ ID NO: 43)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 19)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
Ab901	GAEVKKPGS SVKVSCKAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	DRSTSTAYMELRS LRAEDTAMYYC	(SEQ ID NO: 44)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT VTVSS	(SEQ ID NO: 19)

Ab902	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KALEWMG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQDRVTITR DRSTSTAYMELSS LRAEDTAVYYC	(SEQ ID NO: 45)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)
Ab903	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KALEWMG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQDRVTITR DRSMSTAYMELRS LRAEDTAVYYC	(SEQ ID NO: 46)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)
Ab904	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KALEWMG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSTSTAYMELRS LRAEDTAMYYC	(SEQ ID NO: 47)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)
Ab905	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KALEWMG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSTSTAYMELSS LRAEDTAVYYC	(SEQ ID NO: 48)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)
Ab906	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KALEWMG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSMSTAYMELRS LRAEDTAVYYC	(SEQ ID NO: 49)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)
Ab907	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KALEWMG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQDRVTITR DRSTSTAYMELRS LRAEDTAVYYC	(SEQ ID NO: 50)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)
Ab908	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KALEWMG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSTSTAYMELRS LRAEDTAMYYC	(SEQ ID NO: 47)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)
Ab909	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KALEWMG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSTSTAYMELSS LRAEDTAVYYC	(SEQ ID NO: 48)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)
Ab910	X _{H1} QMLVQS GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KALEWMG	(SEQ ID NO: 13)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSMSTAYMELRS	(SEQ ID NO: 49)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)

[illegible]

	GAEVKKPGS SVKVSCKAS	NO: 21)	YYLH	NO: 59)	QGLEWMG	NO: 16)	GDTE	NO: 60)	DRSMSTAYMELSS LRAEDTAMYYC	NO: 37)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 16)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELSS	(SEQ ID NO: 38)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 19)
Ab920	SVKVSCKAS	NO: 21)	YYLH	NO: 59)	QGLEWMG	NO: 16)	GDTE	NO: 60)	LRAEDTAMYYC	NO: 38)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 16)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELSS	(SEQ ID NO: 39)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 19)
Ab921	SVKVSCKAS	NO: 21)	YYLH	NO: 59)	QGLEWMG	NO: 16)	GDTE	NO: 60)	LRAEDTAMYYC	NO: 39)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 16)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELSS	(SEQ ID NO: 40)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 19)
Ab922	SVKVSCKAS	NO: 21)	YYLH	NO: 59)	QGLEWMG	NO: 16)	GDTE	NO: 60)	LRAEDTAMYYC	NO: 40)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 16)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELSS	(SEQ ID NO: 41)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 19)
Ab923	SVKVSCKAS	NO: 12)	YYLH	NO: 59)	QGLEWMG	NO: 16)	GDTE	NO: 60)	LRAEDTAMYYC	NO: 41)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 16)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELSS	(SEQ ID NO: 42)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 19)
Ab924	SVKVSCKAS	NO: 12)	YYLH	NO: 59)	QGLEWMG	NO: 16)	GDTE	NO: 60)	LRAEDTAMYYC	NO: 42)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 16)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELSS	(SEQ ID NO: 43)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 19)
Ab925	SVKVSCKAS	NO: 12)	YYLH	NO: 59)	QGLEWMG	NO: 16)	GDTE	NO: 60)	LRAEDTAMYYC	NO: 43)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 16)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELSS	(SEQ ID NO: 44)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 19)
Ab926	SVKVSCKAS	NO: 12)	YYLH	NO: 59)	QGLEWMG	NO: 16)	GDTE	NO: 60)	LRAEDTAMYYC	NO: 44)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 16)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELSS	(SEQ ID NO: 45)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 19)
Ab927	SVKVSCKAS	NO: 12)	YYLH	NO: 59)	QGLEWMG	NO: 16)	GDTE	NO: 60)	LRAEDTAMYYC	NO: 45)	SYPMDY	NO: 61)	VTVSS	NO: 19)

Ab928	X _{H1} QMLVQS GAEVKKTGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QGLEWMG	(SEQ ID NO: 16)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQDRVTITR DRSMSTAYMELRS LRAEDTAVYYC	(SEQ ID NO: 46)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)
Ab929	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QGLEWMG	(SEQ ID NO: 16)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSTSTAYMELSS LRAEDTAMYYC	(SEQ ID NO: 41)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)
Ab930	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QGLEWMG	(SEQ ID NO: 16)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSMSTAYMELRS LRAEDTAMYYC	(SEQ ID NO: 42)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)
Ab931	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QGLEWMG	(SEQ ID NO: 16)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSMSTAYMELSS LRAEDTAMYYC	(SEQ ID NO: 43)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)
Ab932	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QGLEWMG	(SEQ ID NO: 16)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQDRVTITR DRSTSTAYMELRS LRAEDTAMYYC	(SEQ ID NO: 44)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)
Ab933	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QGLEWMG	(SEQ ID NO: 16)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQDRVTITR DRSTSTAYMELSS LRAEDTAMYYC	(SEQ ID NO: 45)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)
Ab934	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QGLEWMG	(SEQ ID NO: 16)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQDRVTITR DRSMSTAYMELRS LRAEDTAMYYC	(SEQ ID NO: 46)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)
Ab935	X _{H1} QMLVQS GAEVKKTGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QGLEWMG	(SEQ ID NO: 16)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSTSTAYMELRS LRAEDTAMYYC	(SEQ ID NO: 47)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)
Ab936	X _{H1} QMLVQS GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG QGLEWMG	(SEQ ID NO: 16)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSTSTAYMELSS	(SEQ ID NO: 48)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)

[illegible]

	GAEVKKPGS SVKVSCKAS	NO: 21)	YYLH	NO: 59)	KGLEWMG	NO: 20)	GDTE	NO: 60)	DRSMSTAYMELSS LRAEDTAMYYC	NO: 18)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 20)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELSS	(SEQ ID NO: 37)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 19)
Ab946	SVKVSCKAS	NO: 12)	YYLH	NO: 59)	KGLEWMG	NO: 20)	GDTE	NO: 60)	LRAEDTAMYYC	NO: 38)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 20)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELSS	(SEQ ID NO: 38)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 19)
Ab947	SVKVSCKAS	NO: 12)	YYLH	NO: 59)	KGLEWMG	NO: 20)	GDTE	NO: 60)	LRAEDTAMYYC	NO: 39)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 20)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELRS	(SEQ ID NO: 39)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 19)
Ab948	SVKVSCKAS	NO: 12)	YYLH	NO: 59)	KGLEWMG	NO: 20)	GDTE	NO: 60)	LRAEDTAMYYC	NO: 40)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
	GAEVKKTGS	(SEQ ID NO: 12)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 20)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELSS	(SEQ ID NO: 40)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 19)
Ab949	SVKVSCKAS	NO: 12)	YYLH	NO: 59)	KGLEWMG	NO: 20)	GDTE	NO: 60)	LRAEDTAVYYC	NO: 40)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 20)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELSS	(SEQ ID NO: 37)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 19)
Ab950	SVKVSCKAS	NO: 21)	YYLH	NO: 59)	KGLEWMG	NO: 20)	GDTE	NO: 60)	LRAEDTAMYYC	NO: 38)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 20)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELSS	(SEQ ID NO: 38)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 19)
Ab951	SVKVSCKAS	NO: 21)	YYLH	NO: 59)	KGLEWMG	NO: 20)	GDTE	NO: 60)	LRAEDTAMYYC	NO: 39)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 20)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELRS	(SEQ ID NO: 39)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 19)
Ab952	SVKVSCKAS	NO: 21)	YYLH	NO: 59)	KGLEWMG	NO: 20)	GDTE	NO: 60)	LRAEDTAMYYC	NO: 40)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQDRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 20)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELSS	(SEQ ID NO: 40)	NAAYGSS	(SEQ ID NO: 61)	WGQGT	(SEQ ID NO: 19)
Ab953	SVKVSCKAS	NO: 21)	YYLH	NO: 59)	KGLEWMG	NO: 20)	GDTE	NO: 60)	LRAEDTAVYYC	NO: 40)	SYPMDY	NO: 61)	VTVSS	NO: 19)

Ab954	X _{H1} QMLVQS GAEVKKTGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KGLEWMG	(SEQ ID NO: 20)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSTSTAYMELSS LRAEDTAMYYC	(SEQ ID NO: 41)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)
Ab955	X _{H1} QMLVQS GAEVKKTGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KGLEWMG	(SEQ ID NO: 20)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSMSTAYMELRS LRAEDTAMYYC	(SEQ ID NO: 42)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)
Ab956	X _{H1} QMLVQS GAEVKKTGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KGLEWMG	(SEQ ID NO: 20)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSMSTAYMELSS LRAEDTAVYYC	(SEQ ID NO: 43)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)
Ab957	X _{H1} QMLVQS GAEVKKTGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KGLEWMG	(SEQ ID NO: 20)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQDRVTITR DRSTSTAYMELRS LRAEDTAMYYC	(SEQ ID NO: 44)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)
Ab958	X _{H1} QMLVQS GAEVKKTGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KGLEWMG	(SEQ ID NO: 20)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQDRVTITR DRSTSTAYMELSS LRAEDTAVYYC	(SEQ ID NO: 45)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)
Ab959	X _{H1} QMLVQS GAEVKKTGS SVKVSCAS	(SEQ ID NO: 12)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KGLEWMG	(SEQ ID NO: 20)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQDRVTITR DRSMSTAYMELRS LRAEDTAVYYC	(SEQ ID NO: 46)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)
Ab960	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KGLEWMG	(SEQ ID NO: 20)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSTSTAYMELSS LRAEDTAMYYC	(SEQ ID NO: 41)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)
Ab961	X _{H1} QMLVQS GAEVKKPGS SVKVSCAS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KGLEWMG	(SEQ ID NO: 20)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSMSTAYMELRS LRAEDTAMYYC	(SEQ ID NO: 42)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)
Ab962	X _{H1} QMLVQS GAEVKKPGS	(SEQ ID NO: 21)	GFNIKD YYLH	(SEQ ID NO: 59)	WVRQAPG KGLEWMG	(SEQ ID NO: 20)	WIDPDQ GDTE	(SEQ ID NO: 60)	YAKFQGRVTITR DRSMSTAYMELSS	(SEQ ID NO: 43)	NAAYGSS SYPMDY	(SEQ ID NO: 61)	WGQGT L	(SEQ ID NO: 19)

	SVKVSCKAS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
--	-----------	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

	GAEVKKPGS SVKVSCKAS	NO: 21)	YYLH	NO: 59)	KGLEWMG	NO: 20)	GDTE	NO: 60)	DRSTSTAYMELSS LRAEDTAVYYC	NO: 48)	SYPMDY	NO: 61)	VTVSS	NO: 19)
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GfNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 20)	WIDPDQ	(SEQ ID NO: 60)	DRSMSTAYMELRS	(SEQ ID NO: 49)	NAAYGSS	(SEQ ID NO: 61)	WGQGTTL	(SEQ ID NO: 19)
Ab972	SVKVSCKAS		YYLH		KGLEWMG		GDTE		LRAEDTAVYYC		SYPMDY		VTVSS	
	X _{H1} QMLVQS								YAQKFQDRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GfNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 20)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELRS	(SEQ ID NO: 50)	NAAYGSS	(SEQ ID NO: 61)	WGQGTTL	(SEQ ID NO: 19)
Ab973	SVKVSCKAS		YYLH		KGLEWMG		GDTE		LRAEDTAVYYC		SYPMDY		VTVSS	
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKTGS	(SEQ ID NO: 12)	GfNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 20)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELRS	(SEQ ID NO: 139)	NAAYGSS	(SEQ ID NO: 61)	WGQGTTL	(SEQ ID NO: 19)
Ab974	SVKVSCKAS		YYLH		KGLEWMG		GDTE		LRAEDTAVYYC		SYPMDY		VTVSS	
	X _{H1} QMLVQS								YAQKFQGRVTITR					
	GAEVKKPGS	(SEQ ID NO: 21)	GfNIKD	(SEQ ID NO: 59)	WVRQAPG	(SEQ ID NO: 20)	WIDPDQ	(SEQ ID NO: 60)	DRSTSTAYMELRS	(SEQ ID NO: 139)	NAAYGSS	(SEQ ID NO: 61)	WGQGTTL	(SEQ ID NO: 19)
Ab975	SVKVSCKAS		YYLH		KGLEWMG		GDTE		LRAEDTAVYYC		SYPMDY		VTVSS	

[00214] In a specific embodiment, provided herein is an antibody or antigen-binding fragment thereof of any listed in Table 4, which comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence listed in the second column of Table 4 for the antibody or antigen-binding fragment, VL FR2 comprises the amino acid sequence listed in the sixth column of Table 4 for the antibody or antigen-binding fragment, VL FR3 comprises the amino acid sequence listed in the 10th column of Table 4 for the antibody or antigen-binding fragment, VL FR4 comprises the amino acid sequence listed in the 14th column of Table 4 for the antibody or antigen-binding fragment, VL CDR1 comprises the amino acid sequence listed in the fourth column of Table 4 for the antibody or antigen-binding fragment, VL CDR2 comprises the amino acid sequence listed in the eighth column of Table 4 for the antibody or antigen-binding fragment, and VL CDR3 comprises the amino acid sequence listed in the 12nd column of Table 4 for the antibody or antigen-binding fragment.

[00215] Table 4. Exemplary Antibodies with Specific VL FR sequences and specific VL CDR sequences.

Anti -body	VL -FR1	SEQ ID NO:	VL -CDR 1	SEQ ID NO:	VL -FR2	SEQ ID NO:	VL -CDR 2	SEQ ID NO:	VL -FR3	SEQ ID NO:	VL	SEQ ID NO:	VL -CDR 3	SEQ ID NO:	VL	SEQ ID NO:
Ab976	NIQMTQSPSAMS	(SEQ ID NO: 51)	KASQDI	(SEQ ID NO: 66)	WFQQKPGK	(SEQ ID NO: 52)			GVPSRFSGSGS							
	ASVGDRVTTTC	HR YLS		VPKHLIY		RANRLVS	(SEQ ID NO: 63)	GTEFTLTISL	(SEQ ID NO: 10)	LQYDE	FPYT	(SEQ ID NO: 64)	FGGGTK	VEIK	(SEQ ID NO: 11)	
Ab977	NIQMTQSPSAMS	(SEQ ID NO: 51)	KASQDI	(SEQ ID NO: 66)	WFQQKPGK	(SEQ ID NO: 52)			GVPSRFSGSGS							
	ASVGDRVTTTC	HR YLS		VPKHLIY		RYVRFVD	(SEQ ID NO: 67)	GTEFTLTISL	(SEQ ID NO: 10)	LQYDE	FPYT	(SEQ ID NO: 64)	FGGGTK	VEIK	(SEQ ID NO: 11)	
Ab978	NIQMTQSPSAMS	(SEQ ID NO: 51)	KASQDI	(SEQ ID NO: 66)	WFQQKPGK	(SEQ ID NO: 52)			GVPSRFSGSGS							
	ASVGDRVTTTC	HR YLS		VPKHLIY		RYIRFVD	(SEQ ID NO: 68)	GTEFTLTISL	(SEQ ID NO: 10)	LQYDE	FPYT	(SEQ ID NO: 64)	FGGGTK	VEIK	(SEQ ID NO: 11)	
Ab979	NIQMTQSPSAMS	(SEQ ID NO: 51)	KASQDI	(SEQ ID NO: 66)	WFQQKPGK	(SEQ ID NO: 52)			GVPSRFSGSGS							
	ASVGDRVTTTC	HR YLS		VPKHLIY		RYERFVD	(SEQ ID NO: 69)	GTEFTLTISL	(SEQ ID NO: 10)	LQYDE	FPYT	(SEQ ID NO: 64)	FGGGTK	VEIK	(SEQ ID NO: 11)	
Ab980	NIQMTQSPSAMS	(SEQ ID NO: 51)	KASQDI	(SEQ ID NO: 66)	WFQQKPGK	(SEQ ID NO: 52)			GVPSRFSGSGS							
	ASVGDRVTTTC	HR YLS		VPKHLIY		RYSRFVD	(SEQ ID NO: 70)	GTEFTLTISL	(SEQ ID NO: 10)	LQYDE	FPYT	(SEQ ID NO: 64)	FGGGTK	VEIK	(SEQ ID NO: 11)	
Ab981	NIQMTQSPSAMS	(SEQ ID NO: 51)	KASQDI	(SEQ ID NO: 66)	WFQQKPGK	(SEQ ID NO: 52)			GVPSRFSGSGS							
	ASVGDRVTTTC	HR YLS		VPKHLIY		REVRFVD	(SEQ ID NO: 71)	GTEFTLTISL	(SEQ ID NO: 10)	LQYDE	FPYT	(SEQ ID NO: 64)	FGGGTK	VEIK	(SEQ ID NO: 11)	
Ab982	NIQMTQSPSAMS	(SEQ ID NO: 51)	KASQDI	(SEQ ID NO: 66)	WFQQKPGK	(SEQ ID NO: 52)			GVPSRFSGSGS							
	ASVGDRVTTTC	HR YLS		VPKHLIY		REIRFVD	(SEQ ID NO: 72)	GTEFTLTISL	(SEQ ID NO: 10)	LQYDE	FPYT	(SEQ ID NO: 64)	FGGGTK	VEIK	(SEQ ID NO: 11)	
Ab983	NIQMTQSPSAMS	(SEQ ID NO: 51)	KASQDI	(SEQ ID NO: 66)	WFQQKPGK	(SEQ ID NO: 52)			GVPSRFSGSGS							
	ASVGDRVTTTC	HR YLS		VPKHLIY		REERFVD	(SEQ ID NO: 73)	GTEFTLTISL	(SEQ ID NO: 10)	LQYDE	FPYT	(SEQ ID NO: 64)	FGGGTK	VEIK	(SEQ ID NO: 11)	

[illegible]

	ASVGDRVITC	NO: 51)	HRYLS	NO: 79)	VPKHLIY	NO: 52)		NO: 69)	GTEFTLTISL QPEDFATYYC	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
Ab993	NIQMTQSPSAMS ASVGDRVITC	(SEQ ID NO: 51)	RASQDI HRYLS	(SEQ ID NO: 79)	WFQKPGK VPKHLIY	(SEQ ID NO: 52)	RYSRFVD	(SEQ ID NO: 70)	GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab994	NIQMTQSPSAMS ASVGDRVITC	(SEQ ID NO: 51)	RASQDI HRYLS	(SEQ ID NO: 79)	WFQKPGK VPKHLIY	(SEQ ID NO: 52)	REVRFVD	(SEQ ID NO: 71)	GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab995	NIQMTQSPSAMS ASVGDRVITC	(SEQ ID NO: 51)	RASQDI HRYLS	(SEQ ID NO: 79)	WFQKPGK VPKHLIY	(SEQ ID NO: 52)	REIRFVD	(SEQ ID NO: 72)	GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab996	NIQMTQSPSAMS ASVGDRVITC	(SEQ ID NO: 51)	RASQDI HRYLS	(SEQ ID NO: 79)	WFQKPGK VPKHLIY	(SEQ ID NO: 52)	REERFVD	(SEQ ID NO: 73)	GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab997	NIQMTQSPSAMS ASVGDRVITC	(SEQ ID NO: 51)	RASQDI HRYLS	(SEQ ID NO: 79)	WFQKPGK VPKHLIY	(SEQ ID NO: 52)	RESRFVD	(SEQ ID NO: 74)	GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab998	NIQMTQSPSAMS ASVGDRVITC	(SEQ ID NO: 51)	RASQDI HRYLS	(SEQ ID NO: 79)	WFQKPGK VPKHLIY	(SEQ ID NO: 52)	RHVRFVD	(SEQ ID NO: 75)	GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab999	NIQMTQSPSAMS ASVGDRVITC	(SEQ ID NO: 51)	RASQDI HRYLS	(SEQ ID NO: 79)	WFQKPGK VPKHLIY	(SEQ ID NO: 52)	RHIRFVD	(SEQ ID NO: 76)	GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1000	NIQMTQSPSAMS ASVGDRVITC	(SEQ ID NO: 51)	RASQDI HRYLS	(SEQ ID NO: 79)	WFQKPGK VPKHLIY	(SEQ ID NO: 52)	RHERFVD	(SEQ ID NO: 77)	GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)

Ab1001	NIQMTQSPSAMS ASVGDRVTITC	(SEQ ID NO: 51)	RASQDI HRYLS	(SEQ ID NO: 79)	WFQKPGK VPKHLIY	(SEQ ID NO: 52)	RHSRFVD	(SEQ ID NO: 78)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1002	NIQMTQSPSSMS ASVGDRVTITC	(SEQ ID NO: 53)	KASQDI HRYLS	(SEQ ID NO: 66)	WFQKPGK VPKHLIY	(SEQ ID NO: 52)	RANRLVS	(SEQ ID NO: 63)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1003	NIQMTQSPSSMS ASVGDRVTITC	(SEQ ID NO: 53)	KASQDI HRYLS	(SEQ ID NO: 66)	WFQKPGK VPKHLIY	(SEQ ID NO: 52)	RYVRFVD	(SEQ ID NO: 67)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1004	NIQMTQSPSSMS ASVGDRVTITC	(SEQ ID NO: 53)	KASQDI HRYLS	(SEQ ID NO: 66)	WFQKPGK VPKHLIY	(SEQ ID NO: 52)	RYIRFVD	(SEQ ID NO: 68)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1005	NIQMTQSPSSMS ASVGDRVTITC	(SEQ ID NO: 53)	KASQDI HRYLS	(SEQ ID NO: 66)	WFQKPGK VPKHLIY	(SEQ ID NO: 52)	RYERFVD	(SEQ ID NO: 69)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1006	NIQMTQSPSSMS ASVGDRVTITC	(SEQ ID NO: 53)	KASQDI HRYLS	(SEQ ID NO: 66)	WFQKPGK VPKHLIY	(SEQ ID NO: 52)	RYSRFVD	(SEQ ID NO: 70)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1007	NIQMTQSPSSMS ASVGDRVTITC	(SEQ ID NO: 53)	KASQDI HRYLS	(SEQ ID NO: 66)	WFQKPGK VPKHLIY	(SEQ ID NO: 52)	REVRFVD	(SEQ ID NO: 71)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1008	NIQMTQSPSSMS ASVGDRVTITC	(SEQ ID NO: 53)	KASQDI HRYLS	(SEQ ID NO: 66)	WFQKPGK VPKHLIY	(SEQ ID NO: 52)	REIRFVD	(SEQ ID NO: 72)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1009	NIQMTQSPSSMS ASVGDRVTITC	(SEQ ID NO: 53)	KASQDI HRYLS	(SEQ ID NO: 66)	WFQKPGK VPKHLIY	(SEQ ID NO: 52)	REERFVD	(SEQ ID NO: 73)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)

[illegible]

	ASVGDRVTITC	NO: 53)	HRYLS	NO: 79)	VPKHLIY	NO: 52)		NO: 69)	GTEFTLTISSL QPEDFATYYC	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSSMS	(SEQ ID NO: 53)	RASQDI	(SEQ ID NO: 79)	WFQKPGK	(SEQ ID NO: 52)		(SEQ ID NO: 70)	GTEFTLTISSL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1019	ASVGDRVTITC	NO: 53)	HRYLS	NO: 79)	VPKHLIY	NO: 52)	RYSRFVD	NO: 70)	GVPSRFSGSGS	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSSMS	(SEQ ID NO: 53)	RASQDI	(SEQ ID NO: 79)	WFQKPGK	(SEQ ID NO: 52)		(SEQ ID NO: 71)	GTEFTLTISSL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1020	ASVGDRVTITC	NO: 53)	HRYLS	NO: 79)	VPKHLIY	NO: 52)	REVRFVD	NO: 71)	GVPSRFSGSGS	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSSMS	(SEQ ID NO: 53)	RASQDI	(SEQ ID NO: 79)	WFQKPGK	(SEQ ID NO: 52)		(SEQ ID NO: 72)	GTEFTLTISSL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1021	ASVGDRVTITC	NO: 53)	HRYLS	NO: 79)	VPKHLIY	NO: 52)	REIRFVD	NO: 72)	GVPSRFSGSGS	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSSMS	(SEQ ID NO: 53)	RASQDI	(SEQ ID NO: 79)	WFQKPGK	(SEQ ID NO: 52)		(SEQ ID NO: 73)	GTEFTLTISSL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1022	ASVGDRVTITC	NO: 53)	HRYLS	NO: 79)	VPKHLIY	NO: 52)	REERFVD	NO: 73)	GVPSRFSGSGS	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSSMS	(SEQ ID NO: 53)	RASQDI	(SEQ ID NO: 79)	WFQKPGK	(SEQ ID NO: 52)		(SEQ ID NO: 74)	GTEFTLTISSL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1023	ASVGDRVTITC	NO: 53)	HRYLS	NO: 79)	VPKHLIY	NO: 52)	RESRFVD	NO: 74)	GVPSRFSGSGS	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSSMS	(SEQ ID NO: 53)	RASQDI	(SEQ ID NO: 79)	WFQKPGK	(SEQ ID NO: 52)		(SEQ ID NO: 75)	GTEFTLTISSL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1024	ASVGDRVTITC	NO: 53)	HRYLS	NO: 79)	VPKHLIY	NO: 52)	RHVRFVD	NO: 75)	GVPSRFSGSGS	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSSMS	(SEQ ID NO: 53)	RASQDI	(SEQ ID NO: 79)	WFQKPGK	(SEQ ID NO: 52)		(SEQ ID NO: 76)	GTEFTLTISSL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1025	ASVGDRVTITC	NO: 53)	HRYLS	NO: 79)	VPKHLIY	NO: 52)	RHIRFVD	NO: 76)	GVPSRFSGSGS	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSSMS	(SEQ ID NO: 53)	RASQDI	(SEQ ID NO: 79)	WFQKPGK	(SEQ ID NO: 52)		(SEQ ID NO: 77)	GTEFTLTISSL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1026	ASVGDRVTITC	NO: 53)	HRYLS	NO: 79)	VPKHLIY	NO: 52)	RHERFVD	NO: 77)	GVPSRFSGSGS	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)

Ab1027	NIQMTQSPSALS ASVGDRVTITC	(SEQ ID NO: 53)	RASQDI HRYLS	(SEQ ID NO: 79)	WFQKPGK VPKHLIY	(SEQ ID NO: 52)	RHSRFVD	(SEQ ID NO: 78)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1028	NIQMTQSPSALS ASVGDRVTITC	(SEQ ID NO: 54)	KASQDI HRYLS	(SEQ ID NO: 66)	WFQKPGK VPKHLIY	(SEQ ID NO: 52)	RANRLVS	(SEQ ID NO: 63)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1029	NIQMTQSPSALS ASVGDRVTITC	(SEQ ID NO: 54)	KASQDI HRYLS	(SEQ ID NO: 66)	WFQKPGK VPKHLIY	(SEQ ID NO: 52)	RYVRFVD	(SEQ ID NO: 67)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1030	NIQMTQSPSALS ASVGDRVTITC	(SEQ ID NO: 54)	KASQDI HRYLS	(SEQ ID NO: 66)	WFQKPGK VPKHLIY	(SEQ ID NO: 52)	RYIRFVD	(SEQ ID NO: 68)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1031	NIQMTQSPSALS ASVGDRVTITC	(SEQ ID NO: 54)	KASQDI HRYLS	(SEQ ID NO: 66)	WFQKPGK VPKHLIY	(SEQ ID NO: 52)	RYERFVD	(SEQ ID NO: 69)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1032	NIQMTQSPSALS ASVGDRVTITC	(SEQ ID NO: 54)	KASQDI HRYLS	(SEQ ID NO: 66)	WFQKPGK VPKHLIY	(SEQ ID NO: 52)	RYSRFVD	(SEQ ID NO: 70)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1033	NIQMTQSPSALS ASVGDRVTITC	(SEQ ID NO: 54)	KASQDI HRYLS	(SEQ ID NO: 66)	WFQKPGK VPKHLIY	(SEQ ID NO: 52)	REVRFVD	(SEQ ID NO: 71)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1034	NIQMTQSPSALS ASVGDRVTITC	(SEQ ID NO: 54)	KASQDI HRYLS	(SEQ ID NO: 66)	WFQKPGK VPKHLIY	(SEQ ID NO: 52)	REIRFVD	(SEQ ID NO: 72)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1035	NIQMTQSPSALS ASVGDRVTITC	(SEQ ID NO: 54)	KASQDI HRYLS	(SEQ ID NO: 66)	WFQKPGK VPKHLIY	(SEQ ID NO: 52)	REERFVD	(SEQ ID NO: 73)	GVPSRFSGSGS GTEFTLTISL	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)

[illegible]

	ASVGDRVTITC	NO: 54)	HRYLS	NO: 79)	VPKHLIY	NO: 52)		NO: 69)	GTEFTLTISL QPEDFATYYC	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSALS	(SEQ ID NO: 54)	RASQDI	(SEQ ID NO: 79)	WFQQKPGK	(SEQ ID NO: 52)		(SEQ ID NO: 70)	GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1045	ASVGDRVTITC	HRYLS	HRYLS	NO: 79)	VPKHLIY	NO: 52)	RYSRFVD		GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	FPYT	(SEQ ID NO: 64)	VEIK	(SEQ ID NO: 11)
	NIQMTQSPSALS	(SEQ ID NO: 54)	RASQDI	(SEQ ID NO: 79)	WFQQKPGK	(SEQ ID NO: 52)		(SEQ ID NO: 71)	GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1046	ASVGDRVTITC	HRYLS	HRYLS	NO: 79)	VPKHLIY	NO: 52)	REVRFVD		GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	FPYT	(SEQ ID NO: 64)	VEIK	(SEQ ID NO: 11)
	NIQMTQSPSALS	(SEQ ID NO: 54)	RASQDI	(SEQ ID NO: 79)	WFQQKPGK	(SEQ ID NO: 52)		(SEQ ID NO: 72)	GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1047	ASVGDRVTITC	HRYLS	HRYLS	NO: 79)	VPKHLIY	NO: 52)	REIRFVD		GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	FPYT	(SEQ ID NO: 64)	VEIK	(SEQ ID NO: 11)
	NIQMTQSPSALS	(SEQ ID NO: 54)	RASQDI	(SEQ ID NO: 79)	WFQQKPGK	(SEQ ID NO: 52)		(SEQ ID NO: 73)	GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1048	ASVGDRVTITC	HRYLS	HRYLS	NO: 79)	VPKHLIY	NO: 52)	REERFVD		GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	FPYT	(SEQ ID NO: 64)	VEIK	(SEQ ID NO: 11)
	NIQMTQSPSALS	(SEQ ID NO: 54)	RASQDI	(SEQ ID NO: 79)	WFQQKPGK	(SEQ ID NO: 52)		(SEQ ID NO: 74)	GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1049	ASVGDRVTITC	HRYLS	HRYLS	NO: 79)	VPKHLIY	NO: 52)	RESRFVD		GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	FPYT	(SEQ ID NO: 64)	VEIK	(SEQ ID NO: 11)
	NIQMTQSPSALS	(SEQ ID NO: 54)	RASQDI	(SEQ ID NO: 79)	WFQQKPGK	(SEQ ID NO: 52)		(SEQ ID NO: 75)	GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1050	ASVGDRVTITC	HRYLS	HRYLS	NO: 79)	VPKHLIY	NO: 52)	RHVRFVD		GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	FPYT	(SEQ ID NO: 64)	VEIK	(SEQ ID NO: 11)
	NIQMTQSPSALS	(SEQ ID NO: 54)	RASQDI	(SEQ ID NO: 79)	WFQQKPGK	(SEQ ID NO: 52)		(SEQ ID NO: 76)	GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1051	ASVGDRVTITC	HRYLS	HRYLS	NO: 79)	VPKHLIY	NO: 52)	RHIRFVD		GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	FPYT	(SEQ ID NO: 64)	VEIK	(SEQ ID NO: 11)
	NIQMTQSPSALS	(SEQ ID NO: 54)	RASQDI	(SEQ ID NO: 79)	WFQQKPGK	(SEQ ID NO: 52)		(SEQ ID NO: 77)	GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1052	ASVGDRVTITC	HRYLS	HRYLS	NO: 79)	VPKHLIY	NO: 52)	RHERFVD		GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	FPYT	(SEQ ID NO: 64)	VEIK	(SEQ ID NO: 11)

Ab1053	NIQMTQSPSALS ASVGDRVTITC	(SEQ ID NO: 54)	RASQDI HRYLS	(SEQ ID NO: 79)	WFQQKPGK VPKHLIY	(SEQ ID NO: 52)	RHSRFVD	(SEQ ID NO: 78)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1054	NIQMTQSPSAMS ASVGDRVTITC	(SEQ ID NO: 51)	KASQDI HRYLS	(SEQ ID NO: 66)	WYQQKPGK VPKHLIY	(SEQ ID NO: 55)	RANRLVS	(SEQ ID NO: 63)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1055	NIQMTQSPSAMS ASVGDRVTITC	(SEQ ID NO: 51)	KASQDI HRYLS	(SEQ ID NO: 66)	WYQQKPGK VPKHLIY	(SEQ ID NO: 55)	RYVRFVD	(SEQ ID NO: 67)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1056	NIQMTQSPSAMS ASVGDRVTITC	(SEQ ID NO: 51)	KASQDI HRYLS	(SEQ ID NO: 66)	WYQQKPGK VPKHLIY	(SEQ ID NO: 55)	RYIRFVD	(SEQ ID NO: 68)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1057	NIQMTQSPSAMS ASVGDRVTITC	(SEQ ID NO: 51)	KASQDI HRYLS	(SEQ ID NO: 66)	WYQQKPGK VPKHLIY	(SEQ ID NO: 55)	RYERFVD	(SEQ ID NO: 69)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1058	NIQMTQSPSAMS ASVGDRVTITC	(SEQ ID NO: 51)	KASQDI HRYLS	(SEQ ID NO: 66)	WYQQKPGK VPKHLIY	(SEQ ID NO: 55)	RYSRFVD	(SEQ ID NO: 70)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1059	NIQMTQSPSAMS ASVGDRVTITC	(SEQ ID NO: 51)	KASQDI HRYLS	(SEQ ID NO: 66)	WYQQKPGK VPKHLIY	(SEQ ID NO: 55)	REVRFVD	(SEQ ID NO: 71)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1060	NIQMTQSPSAMS ASVGDRVTITC	(SEQ ID NO: 51)	KASQDI HRYLS	(SEQ ID NO: 66)	WYQQKPGK VPKHLIY	(SEQ ID NO: 55)	REIRFVD	(SEQ ID NO: 72)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1061	NIQMTQSPSAMS ASVGDRVTITC	(SEQ ID NO: 51)	KASQDI HRYLS	(SEQ ID NO: 66)	WYQQKPGK VPKHLIY	(SEQ ID NO: 55)	REERFVD	(SEQ ID NO: 73)	GVPSRFSGSGS GTEFTLTISL	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)

[illegible]

	ASVGDRVTITC	NO: 51)	HRYLS	NO: 79)	VPKHLIY	NO: 55)		NO: 69)	GTEFTLTISL QPEDFATYYC	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSAMS	(SEQ ID NO: 51)	RASQDI	(SEQ ID NO: 79)	WYQQKPGK	(SEQ ID NO: 55)		(SEQ ID NO: 70)	GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1071	ASVGDRVTITC	NO: 51)	HRYLS	NO: 79)	VPKHLIY	NO: 55)	RYSRFVD		GVPSRFSGSGS		FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSAMS	(SEQ ID NO: 51)	RASQDI	(SEQ ID NO: 79)	WYQQKPGK	(SEQ ID NO: 55)		(SEQ ID NO: 71)	GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1072	ASVGDRVTITC	NO: 51)	HRYLS	NO: 79)	VPKHLIY	NO: 55)	REVRFVD		GVPSRFSGSGS		FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSAMS	(SEQ ID NO: 51)	RASQDI	(SEQ ID NO: 79)	WYQQKPGK	(SEQ ID NO: 55)		(SEQ ID NO: 72)	GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1073	ASVGDRVTITC	NO: 51)	HRYLS	NO: 79)	VPKHLIY	NO: 55)	REIRFVD		GVPSRFSGSGS		FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSAMS	(SEQ ID NO: 51)	RASQDI	(SEQ ID NO: 79)	WYQQKPGK	(SEQ ID NO: 55)		(SEQ ID NO: 73)	GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1074	ASVGDRVTITC	NO: 51)	HRYLS	NO: 79)	VPKHLIY	NO: 55)	REERFVD		GVPSRFSGSGS		FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSAMS	(SEQ ID NO: 51)	RASQDI	(SEQ ID NO: 79)	WYQQKPGK	(SEQ ID NO: 55)		(SEQ ID NO: 74)	GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1075	ASVGDRVTITC	NO: 51)	HRYLS	NO: 79)	VPKHLIY	NO: 55)	RESRFVD		GVPSRFSGSGS		FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSAMS	(SEQ ID NO: 51)	RASQDI	(SEQ ID NO: 79)	WYQQKPGK	(SEQ ID NO: 55)		(SEQ ID NO: 75)	GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1076	ASVGDRVTITC	NO: 51)	HRYLS	NO: 79)	VPKHLIY	NO: 55)	RHVRFVD		GVPSRFSGSGS		FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSAMS	(SEQ ID NO: 51)	RASQDI	(SEQ ID NO: 79)	WYQQKPGK	(SEQ ID NO: 55)		(SEQ ID NO: 76)	GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1077	ASVGDRVTITC	NO: 51)	HRYLS	NO: 79)	VPKHLIY	NO: 55)	RHIRFVD		GVPSRFSGSGS		FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSAMS	(SEQ ID NO: 51)	RASQDI	(SEQ ID NO: 79)	WYQQKPGK	(SEQ ID NO: 55)		(SEQ ID NO: 77)	GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1078	ASVGDRVTITC	NO: 51)	HRYLS	NO: 79)	VPKHLIY	NO: 55)	RHERFVD		GVPSRFSGSGS		FPYT	NO: 64)	VEIK	NO: 11)

Ab1079	NIQMTQSPSAMS ASVGDRVTITC	(SEQ ID NO: 51)	RASQDI HRYLS	(SEQ ID NO: 79)	WYQQKPGK VPKHLIY	(SEQ ID NO: 55)	RHSRFVD	(SEQ ID NO: 78)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1080	NIQMTQSPSAMS ASVGDRVTITC	(SEQ ID NO: 51)	KASQDI HRYLS	(SEQ ID NO: 66)	WFQQKPGK APKHLIY	(SEQ ID NO: 56)	RANRLVS	(SEQ ID NO: 63)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1081	NIQMTQSPSAMS ASVGDRVTITC	(SEQ ID NO: 51)	KASQDI HRYLS	(SEQ ID NO: 66)	WFQQKPGK APKHLIY	(SEQ ID NO: 56)	RYVRFVD	(SEQ ID NO: 67)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1082	NIQMTQSPSAMS ASVGDRVTITC	(SEQ ID NO: 51)	KASQDI HRYLS	(SEQ ID NO: 66)	WFQQKPGK APKHLIY	(SEQ ID NO: 56)	RYIRFVD	(SEQ ID NO: 68)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1083	NIQMTQSPSAMS ASVGDRVTITC	(SEQ ID NO: 51)	KASQDI HRYLS	(SEQ ID NO: 66)	WFQQKPGK APKHLIY	(SEQ ID NO: 56)	RYERFVD	(SEQ ID NO: 69)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1084	NIQMTQSPSAMS ASVGDRVTITC	(SEQ ID NO: 51)	KASQDI HRYLS	(SEQ ID NO: 66)	WFQQKPGK APKHLIY	(SEQ ID NO: 56)	RYSRFVD	(SEQ ID NO: 70)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1085	NIQMTQSPSAMS ASVGDRVTITC	(SEQ ID NO: 51)	KASQDI HRYLS	(SEQ ID NO: 66)	WFQQKPGK APKHLIY	(SEQ ID NO: 56)	REVRFVD	(SEQ ID NO: 71)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1086	NIQMTQSPSAMS ASVGDRVTITC	(SEQ ID NO: 51)	KASQDI HRYLS	(SEQ ID NO: 66)	WFQQKPGK APKHLIY	(SEQ ID NO: 56)	REIRFVD	(SEQ ID NO: 72)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1087	NIQMTQSPSAMS ASVGDRVTITC	(SEQ ID NO: 51)	KASQDI HRYLS	(SEQ ID NO: 66)	WFQQKPGK APKHLIY	(SEQ ID NO: 56)	REERFVD	(SEQ ID NO: 73)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)

[illegible]

	ASVGDRVTITC	NO: 51)	HRYLS	NO: 79)	APKHLIY	NO: 56)		NO: 69)	GTEFTLTISL QPEDFATYYC	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSAMS	(SEQ ID NO: 51)	RASQDI	(SEQ ID NO: 79)	WFQQKPGK	(SEQ ID NO: 56)		(SEQ ID NO: 70)	GVPSRFSGSGS	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1097	ASVGDRVTITC	NO: 51)	HRYLS	NO: 79)	APKHLIY	NO: 56)	RYSRFVD		GVPSRFSGSGS	(SEQ ID NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSAMS	(SEQ ID NO: 51)	RASQDI	(SEQ ID NO: 79)	WFQQKPGK	(SEQ ID NO: 56)		(SEQ ID NO: 71)	GVPSRFSGSGS	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1098	ASVGDRVTITC	NO: 51)	HRYLS	NO: 79)	APKHLIY	NO: 56)	REVRFVD		GVPSRFSGSGS	(SEQ ID NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSAMS	(SEQ ID NO: 51)	RASQDI	(SEQ ID NO: 79)	WFQQKPGK	(SEQ ID NO: 56)		(SEQ ID NO: 72)	GVPSRFSGSGS	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1099	ASVGDRVTITC	NO: 51)	HRYLS	NO: 79)	APKHLIY	NO: 56)	REIRFVD		GVPSRFSGSGS	(SEQ ID NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSAMS	(SEQ ID NO: 51)	RASQDI	(SEQ ID NO: 79)	WFQQKPGK	(SEQ ID NO: 56)		(SEQ ID NO: 73)	GVPSRFSGSGS	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1100	ASVGDRVTITC	NO: 51)	HRYLS	NO: 79)	APKHLIY	NO: 56)	REERFVD		GVPSRFSGSGS	(SEQ ID NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSAMS	(SEQ ID NO: 51)	RASQDI	(SEQ ID NO: 79)	WFQQKPGK	(SEQ ID NO: 56)		(SEQ ID NO: 74)	GVPSRFSGSGS	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1101	ASVGDRVTITC	NO: 51)	HRYLS	NO: 79)	APKHLIY	NO: 56)	RESRFVD		GVPSRFSGSGS	(SEQ ID NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSAMS	(SEQ ID NO: 51)	RASQDI	(SEQ ID NO: 79)	WFQQKPGK	(SEQ ID NO: 56)		(SEQ ID NO: 75)	GVPSRFSGSGS	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1102	ASVGDRVTITC	NO: 51)	HRYLS	NO: 79)	APKHLIY	NO: 56)	RHVRFVD		GVPSRFSGSGS	(SEQ ID NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSAMS	(SEQ ID NO: 51)	RASQDI	(SEQ ID NO: 79)	WFQQKPGK	(SEQ ID NO: 56)		(SEQ ID NO: 76)	GVPSRFSGSGS	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1103	ASVGDRVTITC	NO: 51)	HRYLS	NO: 79)	APKHLIY	NO: 56)	RHIRFVD		GVPSRFSGSGS	(SEQ ID NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSAMS	(SEQ ID NO: 51)	RASQDI	(SEQ ID NO: 79)	WFQQKPGK	(SEQ ID NO: 56)		(SEQ ID NO: 77)	GVPSRFSGSGS	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1104	ASVGDRVTITC	NO: 51)	HRYLS	NO: 79)	APKHLIY	NO: 56)	RHERFVD		GVPSRFSGSGS	(SEQ ID NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)

Ab1105	NIQMTQSPSAMS ASVGDRVTITC	(SEQ ID NO: 51)	RASQDI HRYLS	(SEQ ID NO: 79)	WFQKPGK APKHLIY	(SEQ ID NO: 56)	RHSRFVD	(SEQ ID NO: 78)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1106	NIQMTQSPSSL ASVGDRVTITC	(SEQ ID NO: 57)	KASQDI HRYLS	(SEQ ID NO: 66)	WFQKPGK VPKHLIY	(SEQ ID NO: 52)	RANRLVS	(SEQ ID NO: 63)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1107	NIQMTQSPSSL ASVGDRVTITC	(SEQ ID NO: 57)	KASQDI HRYLS	(SEQ ID NO: 66)	WFQKPGK VPKHLIY	(SEQ ID NO: 52)	RYVRFVD	(SEQ ID NO: 67)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1108	NIQMTQSPSSL ASVGDRVTITC	(SEQ ID NO: 57)	KASQDI HRYLS	(SEQ ID NO: 66)	WFQKPGK VPKHLIY	(SEQ ID NO: 52)	RYIRFVD	(SEQ ID NO: 68)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1109	NIQMTQSPSSL ASVGDRVTITC	(SEQ ID NO: 57)	KASQDI HRYLS	(SEQ ID NO: 66)	WFQKPGK VPKHLIY	(SEQ ID NO: 52)	RYERFVD	(SEQ ID NO: 69)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1110	NIQMTQSPSSL ASVGDRVTITC	(SEQ ID NO: 57)	KASQDI HRYLS	(SEQ ID NO: 66)	WFQKPGK VPKHLIY	(SEQ ID NO: 52)	RYSRFVD	(SEQ ID NO: 70)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1111	NIQMTQSPSSL ASVGDRVTITC	(SEQ ID NO: 57)	KASQDI HRYLS	(SEQ ID NO: 66)	WFQKPGK VPKHLIY	(SEQ ID NO: 52)	REVRFVD	(SEQ ID NO: 71)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1112	NIQMTQSPSSL ASVGDRVTITC	(SEQ ID NO: 57)	KASQDI HRYLS	(SEQ ID NO: 66)	WFQKPGK VPKHLIY	(SEQ ID NO: 52)	REIRFVD	(SEQ ID NO: 72)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1113	NIQMTQSPSSL ASVGDRVTITC	(SEQ ID NO: 57)	KASQDI HRYLS	(SEQ ID NO: 66)	WFQKPGK VPKHLIY	(SEQ ID NO: 52)	REERFVD	(SEQ ID NO: 73)	GVPSRFSGSGS GTEFTLTISL	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)

[illegible]

	ASVGDRVTITC	NO: 57)	HRYLS	NO: 79)	VPKHLIY	NO: 52)		NO: 69)	GTEFTLTISL QPEDFATYYC	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSSL	(SEQ ID NO: 57)	RASQDI	(SEQ ID NO: 79)	WFQKPGK	(SEQ ID NO: 52)		(SEQ ID NO: 70)	GTEFTLTISL	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1123	ASVGDRVTITC	NO: 57)	HRYLS	NO: 79)	VPKHLIY	NO: 52)	RYSRFVD	NO: 71)	QPEDFATYYC	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSSL	(SEQ ID NO: 57)	RASQDI	(SEQ ID NO: 79)	WFQKPGK	(SEQ ID NO: 52)		(SEQ ID NO: 72)	GTEFTLTISL	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1124	ASVGDRVTITC	NO: 57)	HRYLS	NO: 79)	VPKHLIY	NO: 52)	REVRFVD	NO: 73)	QPEDFATYYC	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSSL	(SEQ ID NO: 57)	RASQDI	(SEQ ID NO: 79)	WFQKPGK	(SEQ ID NO: 52)		(SEQ ID NO: 74)	GTEFTLTISL	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1125	ASVGDRVTITC	NO: 57)	HRYLS	NO: 79)	VPKHLIY	NO: 52)	REIRFVD	NO: 75)	QPEDFATYYC	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSSL	(SEQ ID NO: 57)	RASQDI	(SEQ ID NO: 79)	WFQKPGK	(SEQ ID NO: 52)		(SEQ ID NO: 76)	GTEFTLTISL	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1126	ASVGDRVTITC	NO: 57)	HRYLS	NO: 79)	VPKHLIY	NO: 52)	REERFVD	NO: 77)	QPEDFATYYC	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSSL	(SEQ ID NO: 57)	RASQDI	(SEQ ID NO: 79)	WFQKPGK	(SEQ ID NO: 52)		(SEQ ID NO: 78)	GTEFTLTISL	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1127	ASVGDRVTITC	NO: 57)	HRYLS	NO: 79)	VPKHLIY	NO: 52)	RESRFVD	NO: 79)	QPEDFATYYC	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSSL	(SEQ ID NO: 57)	RASQDI	(SEQ ID NO: 79)	WFQKPGK	(SEQ ID NO: 52)		(SEQ ID NO: 80)	GTEFTLTISL	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1128	ASVGDRVTITC	NO: 57)	HRYLS	NO: 79)	VPKHLIY	NO: 52)	RHVRFVD	NO: 81)	QPEDFATYYC	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSSL	(SEQ ID NO: 57)	RASQDI	(SEQ ID NO: 79)	WFQKPGK	(SEQ ID NO: 52)		(SEQ ID NO: 82)	GTEFTLTISL	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1129	ASVGDRVTITC	NO: 57)	HRYLS	NO: 79)	VPKHLIY	NO: 52)	RHIRFVD	NO: 83)	QPEDFATYYC	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSSL	(SEQ ID NO: 57)	RASQDI	(SEQ ID NO: 79)	WFQKPGK	(SEQ ID NO: 52)		(SEQ ID NO: 84)	GTEFTLTISL	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1130	ASVGDRVTITC	NO: 57)	HRYLS	NO: 79)	VPKHLIY	NO: 52)	RHERFVD	NO: 85)	QPEDFATYYC	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)

Ab1131	NIQMTQSPSSLS ASVGDRVTITC	(SEQ ID NO: 57)	RASQDI HRYLS	(SEQ ID NO: 79)	WFQQKPGK VPKHLIY	(SEQ ID NO: 52)	RHSRFVD	(SEQ ID NO: 78)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1132	NIQMTQSPSSMS ASVGDRVTITC	(SEQ ID NO: 53)	KASQDI HRYLS	(SEQ ID NO: 66)	WYQQKPGK VPKHLIY	(SEQ ID NO: 55)	RANRLVS	(SEQ ID NO: 63)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1133	NIQMTQSPSSMS ASVGDRVTITC	(SEQ ID NO: 53)	KASQDI HRYLS	(SEQ ID NO: 66)	WYQQKPGK VPKHLIY	(SEQ ID NO: 55)	RYVRFVD	(SEQ ID NO: 67)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1134	NIQMTQSPSSMS ASVGDRVTITC	(SEQ ID NO: 53)	KASQDI HRYLS	(SEQ ID NO: 66)	WYQQKPGK VPKHLIY	(SEQ ID NO: 55)	RYIRFVD	(SEQ ID NO: 68)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1135	NIQMTQSPSSMS ASVGDRVTITC	(SEQ ID NO: 53)	KASQDI HRYLS	(SEQ ID NO: 66)	WYQQKPGK VPKHLIY	(SEQ ID NO: 55)	RYERFVD	(SEQ ID NO: 69)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1136	NIQMTQSPSSMS ASVGDRVTITC	(SEQ ID NO: 53)	KASQDI HRYLS	(SEQ ID NO: 66)	WYQQKPGK VPKHLIY	(SEQ ID NO: 55)	RYSRFVD	(SEQ ID NO: 70)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1137	NIQMTQSPSSMS ASVGDRVTITC	(SEQ ID NO: 53)	KASQDI HRYLS	(SEQ ID NO: 66)	WYQQKPGK VPKHLIY	(SEQ ID NO: 55)	REVRFVD	(SEQ ID NO: 71)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1138	NIQMTQSPSSMS ASVGDRVTITC	(SEQ ID NO: 53)	KASQDI HRYLS	(SEQ ID NO: 66)	WYQQKPGK VPKHLIY	(SEQ ID NO: 55)	REIRFVD	(SEQ ID NO: 72)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1139	NIQMTQSPSSMS ASVGDRVTITC	(SEQ ID NO: 53)	KASQDI HRYLS	(SEQ ID NO: 66)	WYQQKPGK VPKHLIY	(SEQ ID NO: 55)	REERFVD	(SEQ ID NO: 73)	GVPSRFSGSGS GTEFTLTISL	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)

[illegible]

	ASVGDRVTITC	NO: 53)	HRYLS	NO: 79)	VPKHLIY	NO: 55)		NO: 69)	GTEFTLTISL QPEDFATYYC	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSSMS	(SEQ ID NO: 53)	RASQDI	(SEQ ID NO: 79)	WYQQKPGK	(SEQ ID NO: 55)		(SEQ ID NO: 70)	GTEFTLTISL	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1149	ASVGDRVTITC	HRYLS	HRYLS	NO: 79)	VPKHLIY	NO: 55)	RYSRFVD		QPEDFATYYC	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSSMS	(SEQ ID NO: 53)	RASQDI	(SEQ ID NO: 79)	WYQQKPGK	(SEQ ID NO: 55)		(SEQ ID NO: 71)	GVPSRFSGSGS	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1150	ASVGDRVTITC	HRYLS	HRYLS	NO: 79)	VPKHLIY	NO: 55)	REVRFVD		QPEDFATYYC	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSSMS	(SEQ ID NO: 53)	RASQDI	(SEQ ID NO: 79)	WYQQKPGK	(SEQ ID NO: 55)		(SEQ ID NO: 72)	GVPSRFSGSGS	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1151	ASVGDRVTITC	HRYLS	HRYLS	NO: 79)	VPKHLIY	NO: 55)	REIRFVD		QPEDFATYYC	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSSMS	(SEQ ID NO: 53)	RASQDI	(SEQ ID NO: 79)	WYQQKPGK	(SEQ ID NO: 55)		(SEQ ID NO: 73)	GVPSRFSGSGS	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1152	ASVGDRVTITC	HRYLS	HRYLS	NO: 79)	VPKHLIY	NO: 55)	REERFVD		QPEDFATYYC	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSSMS	(SEQ ID NO: 53)	RASQDI	(SEQ ID NO: 79)	WYQQKPGK	(SEQ ID NO: 55)		(SEQ ID NO: 74)	GVPSRFSGSGS	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1153	ASVGDRVTITC	HRYLS	HRYLS	NO: 79)	VPKHLIY	NO: 55)	RESRFVD		QPEDFATYYC	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSSMS	(SEQ ID NO: 53)	RASQDI	(SEQ ID NO: 79)	WYQQKPGK	(SEQ ID NO: 55)		(SEQ ID NO: 75)	GVPSRFSGSGS	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1154	ASVGDRVTITC	HRYLS	HRYLS	NO: 79)	VPKHLIY	NO: 55)	RHVRFVD		QPEDFATYYC	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSSMS	(SEQ ID NO: 53)	RASQDI	(SEQ ID NO: 79)	WYQQKPGK	(SEQ ID NO: 55)		(SEQ ID NO: 76)	GVPSRFSGSGS	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1155	ASVGDRVTITC	HRYLS	HRYLS	NO: 79)	VPKHLIY	NO: 55)	RHIRFVD		QPEDFATYYC	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSSMS	(SEQ ID NO: 53)	RASQDI	(SEQ ID NO: 79)	WYQQKPGK	(SEQ ID NO: 55)		(SEQ ID NO: 77)	GVPSRFSGSGS	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1156	ASVGDRVTITC	HRYLS	HRYLS	NO: 79)	VPKHLIY	NO: 55)	RHERFVD		QPEDFATYYC	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)

Ab1157	NIQMTQSPSSMS ASVGDRVTITC	(SEQ ID NO: 53)	RASQDI HRYLS	(SEQ ID NO: 79)	WYQQKPGK VPKHLIY	(SEQ ID NO: 55)	RHSRFVD	(SEQ ID NO: 78)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1158	NIQMTQSPSSMS ASVGDRVTITC	(SEQ ID NO: 53)	KASQDI HRYLS	(SEQ ID NO: 66)	WFQQKPGK APKHLIY	(SEQ ID NO: 56)	RANRLVS	(SEQ ID NO: 63)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1159	NIQMTQSPSSMS ASVGDRVTITC	(SEQ ID NO: 53)	KASQDI HRYLS	(SEQ ID NO: 66)	WFQQKPGK APKHLIY	(SEQ ID NO: 56)	RYVRFVD	(SEQ ID NO: 67)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1160	NIQMTQSPSSMS ASVGDRVTITC	(SEQ ID NO: 53)	KASQDI HRYLS	(SEQ ID NO: 66)	WFQQKPGK APKHLIY	(SEQ ID NO: 56)	RYIRFVD	(SEQ ID NO: 68)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1161	NIQMTQSPSSMS ASVGDRVTITC	(SEQ ID NO: 53)	KASQDI HRYLS	(SEQ ID NO: 66)	WFQQKPGK APKHLIY	(SEQ ID NO: 56)	RYERFVD	(SEQ ID NO: 69)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1162	NIQMTQSPSSMS ASVGDRVTITC	(SEQ ID NO: 53)	KASQDI HRYLS	(SEQ ID NO: 66)	WFQQKPGK APKHLIY	(SEQ ID NO: 56)	RYSRFVD	(SEQ ID NO: 70)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1163	NIQMTQSPSSMS ASVGDRVTITC	(SEQ ID NO: 53)	KASQDI HRYLS	(SEQ ID NO: 66)	WFQQKPGK APKHLIY	(SEQ ID NO: 56)	REVRFVD	(SEQ ID NO: 71)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1164	NIQMTQSPSSMS ASVGDRVTITC	(SEQ ID NO: 53)	KASQDI HRYLS	(SEQ ID NO: 66)	WFQQKPGK APKHLIY	(SEQ ID NO: 56)	REIRFVD	(SEQ ID NO: 72)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1165	NIQMTQSPSSMS ASVGDRVTITC	(SEQ ID NO: 53)	KASQDI HRYLS	(SEQ ID NO: 66)	WFQQKPGK APKHLIY	(SEQ ID NO: 56)	REERFVD	(SEQ ID NO: 73)	GVPSRFSGSGS GTEFTLTISL	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)

[illegible]

	ASVGDRVTITC	NO: 53)	HRYLS	NO: 79)	APKHLIY	NO: 56)		NO: 69)	GTEFTLTISL QPEDFATYYC	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSSMS	(SEQ ID NO: 53)	RASQDI	(SEQ ID NO: 79)	WFQQKPGK	(SEQ ID NO: 56)		(SEQ ID NO: 70)	GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1175	ASVGDRVTITC	HRYLS	HRYLS	NO: 79)	APKHLIY	NO: 56)	RYSRFVD		GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	FPYT	(SEQ ID NO: 64)	VEIK	(SEQ ID NO: 11)
	NIQMTQSPSSMS	(SEQ ID NO: 53)	RASQDI	(SEQ ID NO: 79)	WFQQKPGK	(SEQ ID NO: 56)		(SEQ ID NO: 71)	GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1176	ASVGDRVTITC	HRYLS	HRYLS	NO: 79)	APKHLIY	NO: 56)	REVRFVD		GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	FPYT	(SEQ ID NO: 64)	VEIK	(SEQ ID NO: 11)
	NIQMTQSPSSMS	(SEQ ID NO: 53)	RASQDI	(SEQ ID NO: 79)	WFQQKPGK	(SEQ ID NO: 56)		(SEQ ID NO: 72)	GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1177	ASVGDRVTITC	HRYLS	HRYLS	NO: 79)	APKHLIY	NO: 56)	REIRFVD		GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	FPYT	(SEQ ID NO: 64)	VEIK	(SEQ ID NO: 11)
	NIQMTQSPSSMS	(SEQ ID NO: 53)	RASQDI	(SEQ ID NO: 79)	WFQQKPGK	(SEQ ID NO: 56)		(SEQ ID NO: 73)	GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1178	ASVGDRVTITC	HRYLS	HRYLS	NO: 79)	APKHLIY	NO: 56)	REERFVD		GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	FPYT	(SEQ ID NO: 64)	VEIK	(SEQ ID NO: 11)
	NIQMTQSPSSMS	(SEQ ID NO: 53)	RASQDI	(SEQ ID NO: 79)	WFQQKPGK	(SEQ ID NO: 56)		(SEQ ID NO: 74)	GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1179	ASVGDRVTITC	HRYLS	HRYLS	NO: 79)	APKHLIY	NO: 56)	RESRFVD		GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	FPYT	(SEQ ID NO: 64)	VEIK	(SEQ ID NO: 11)
	NIQMTQSPSSMS	(SEQ ID NO: 53)	RASQDI	(SEQ ID NO: 79)	WFQQKPGK	(SEQ ID NO: 56)		(SEQ ID NO: 75)	GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1180	ASVGDRVTITC	HRYLS	HRYLS	NO: 79)	APKHLIY	NO: 56)	RHVRFVD		GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	FPYT	(SEQ ID NO: 64)	VEIK	(SEQ ID NO: 11)
	NIQMTQSPSSMS	(SEQ ID NO: 53)	RASQDI	(SEQ ID NO: 79)	WFQQKPGK	(SEQ ID NO: 56)		(SEQ ID NO: 76)	GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1181	ASVGDRVTITC	HRYLS	HRYLS	NO: 79)	APKHLIY	NO: 56)	RHIRFVD		GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	FPYT	(SEQ ID NO: 64)	VEIK	(SEQ ID NO: 11)
	NIQMTQSPSSMS	(SEQ ID NO: 53)	RASQDI	(SEQ ID NO: 79)	WFQQKPGK	(SEQ ID NO: 56)		(SEQ ID NO: 77)	GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1182	ASVGDRVTITC	HRYLS	HRYLS	NO: 79)	APKHLIY	NO: 56)	RHERFVD		GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	FPYT	(SEQ ID NO: 64)	VEIK	(SEQ ID NO: 11)

Ab1183	NIQMTQSPSALS ASVGDRVTITC	(SEQ ID NO: 53)	RASQDI HRYLS	(SEQ ID NO: 79)	WFQQKPGK APKHLIY	(SEQ ID NO: 56)	RHSRFVD	(SEQ ID NO: 78)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1184	NIQMTQSPSALS ASVGDRVTITC	(SEQ ID NO: 54)	KASQDI HRYLS	(SEQ ID NO: 66)	WYQQKPGK VPKHLIY	(SEQ ID NO: 55)	RANRLVS	(SEQ ID NO: 63)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1185	NIQMTQSPSALS ASVGDRVTITC	(SEQ ID NO: 54)	KASQDI HRYLS	(SEQ ID NO: 66)	WYQQKPGK VPKHLIY	(SEQ ID NO: 55)	RYVRFVD	(SEQ ID NO: 67)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1186	NIQMTQSPSALS ASVGDRVTITC	(SEQ ID NO: 54)	KASQDI HRYLS	(SEQ ID NO: 66)	WYQQKPGK VPKHLIY	(SEQ ID NO: 55)	RYIRFVD	(SEQ ID NO: 68)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1187	NIQMTQSPSALS ASVGDRVTITC	(SEQ ID NO: 54)	KASQDI HRYLS	(SEQ ID NO: 66)	WYQQKPGK VPKHLIY	(SEQ ID NO: 55)	RYERFVD	(SEQ ID NO: 69)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1188	NIQMTQSPSALS ASVGDRVTITC	(SEQ ID NO: 54)	KASQDI HRYLS	(SEQ ID NO: 66)	WYQQKPGK VPKHLIY	(SEQ ID NO: 55)	RYSRFVD	(SEQ ID NO: 70)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1189	NIQMTQSPSALS ASVGDRVTITC	(SEQ ID NO: 54)	KASQDI HRYLS	(SEQ ID NO: 66)	WYQQKPGK VPKHLIY	(SEQ ID NO: 55)	REVRFVD	(SEQ ID NO: 71)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1190	NIQMTQSPSALS ASVGDRVTITC	(SEQ ID NO: 54)	KASQDI HRYLS	(SEQ ID NO: 66)	WYQQKPGK VPKHLIY	(SEQ ID NO: 55)	REIRFVD	(SEQ ID NO: 72)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1191	NIQMTQSPSALS ASVGDRVTITC	(SEQ ID NO: 54)	KASQDI HRYLS	(SEQ ID NO: 66)	WYQQKPGK VPKHLIY	(SEQ ID NO: 55)	REERFVD	(SEQ ID NO: 73)	GVPSRFSGSGS GTEFTLTISL	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)

[illegible]

	ASVGDRVTITC	NO: 54)	HRYLS	NO: 79)	VPKHLIY	NO: 55)		NO: 69)	GTEFTLTISL QPEDFATYYC	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSALS	(SEQ ID NO: 54)	RASQDI	(SEQ ID NO: 79)	WYQQKPGK	(SEQ ID NO: 55)		(SEQ ID NO: 70)	GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1201	ASVGDRVTITC	HRYLS	HRYLS	NO: 79)	VPKHLIY	NO: 55)	RYSRFVD		GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	FPYT	(SEQ ID NO: 64)	VEIK	(SEQ ID NO: 11)
	NIQMTQSPSALS	(SEQ ID NO: 54)	RASQDI	(SEQ ID NO: 79)	WYQQKPGK	(SEQ ID NO: 55)		(SEQ ID NO: 71)	GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1202	ASVGDRVTITC	HRYLS	HRYLS	NO: 79)	VPKHLIY	NO: 55)	REVRFVD		GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	FPYT	(SEQ ID NO: 64)	VEIK	(SEQ ID NO: 11)
	NIQMTQSPSALS	(SEQ ID NO: 54)	RASQDI	(SEQ ID NO: 79)	WYQQKPGK	(SEQ ID NO: 55)		(SEQ ID NO: 72)	GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1203	ASVGDRVTITC	HRYLS	HRYLS	NO: 79)	VPKHLIY	NO: 55)	REIRFVD		GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	FPYT	(SEQ ID NO: 64)	VEIK	(SEQ ID NO: 11)
	NIQMTQSPSALS	(SEQ ID NO: 54)	RASQDI	(SEQ ID NO: 79)	WYQQKPGK	(SEQ ID NO: 55)		(SEQ ID NO: 73)	GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1204	ASVGDRVTITC	HRYLS	HRYLS	NO: 79)	VPKHLIY	NO: 55)	REERFVD		GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	FPYT	(SEQ ID NO: 64)	VEIK	(SEQ ID NO: 11)
	NIQMTQSPSALS	(SEQ ID NO: 54)	RASQDI	(SEQ ID NO: 79)	WYQQKPGK	(SEQ ID NO: 55)		(SEQ ID NO: 74)	GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1205	ASVGDRVTITC	HRYLS	HRYLS	NO: 79)	VPKHLIY	NO: 55)	RESRFVD		GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	FPYT	(SEQ ID NO: 64)	VEIK	(SEQ ID NO: 11)
	NIQMTQSPSALS	(SEQ ID NO: 54)	RASQDI	(SEQ ID NO: 79)	WYQQKPGK	(SEQ ID NO: 55)		(SEQ ID NO: 75)	GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1206	ASVGDRVTITC	HRYLS	HRYLS	NO: 79)	VPKHLIY	NO: 55)	RHVRFVD		GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	FPYT	(SEQ ID NO: 64)	VEIK	(SEQ ID NO: 11)
	NIQMTQSPSALS	(SEQ ID NO: 54)	RASQDI	(SEQ ID NO: 79)	WYQQKPGK	(SEQ ID NO: 55)		(SEQ ID NO: 76)	GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1207	ASVGDRVTITC	HRYLS	HRYLS	NO: 79)	VPKHLIY	NO: 55)	RHIRFVD		GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	FPYT	(SEQ ID NO: 64)	VEIK	(SEQ ID NO: 11)
	NIQMTQSPSALS	(SEQ ID NO: 54)	RASQDI	(SEQ ID NO: 79)	WYQQKPGK	(SEQ ID NO: 55)		(SEQ ID NO: 77)	GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1208	ASVGDRVTITC	HRYLS	HRYLS	NO: 79)	VPKHLIY	NO: 55)	RHERFVD		GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	FPYT	(SEQ ID NO: 64)	VEIK	(SEQ ID NO: 11)

Ab1209	NIQMTQSPSALS ASVGDRVTITC	(SEQ ID NO: 54)	RASQDI HRYLS	(SEQ ID NO: 79)	WYQQKPGK VPKHLIY	(SEQ ID NO: 55)	RHSRFVD	(SEQ ID NO: 78)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1210	NIQMTQSPSALS ASVGDRVTITC	(SEQ ID NO: 54)	KASQDI HRYLS	(SEQ ID NO: 66)	WFQQKPGK APKHLIY	(SEQ ID NO: 56)	RANRLVS	(SEQ ID NO: 63)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1211	NIQMTQSPSALS ASVGDRVTITC	(SEQ ID NO: 54)	KASQDI HRYLS	(SEQ ID NO: 66)	WFQQKPGK APKHLIY	(SEQ ID NO: 56)	RYVRFVD	(SEQ ID NO: 67)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1212	NIQMTQSPSALS ASVGDRVTITC	(SEQ ID NO: 54)	KASQDI HRYLS	(SEQ ID NO: 66)	WFQQKPGK APKHLIY	(SEQ ID NO: 56)	RYIRFVD	(SEQ ID NO: 68)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1213	NIQMTQSPSALS ASVGDRVTITC	(SEQ ID NO: 54)	KASQDI HRYLS	(SEQ ID NO: 66)	WFQQKPGK APKHLIY	(SEQ ID NO: 56)	RYERFVD	(SEQ ID NO: 69)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1214	NIQMTQSPSALS ASVGDRVTITC	(SEQ ID NO: 54)	KASQDI HRYLS	(SEQ ID NO: 66)	WFQQKPGK APKHLIY	(SEQ ID NO: 56)	RYSRFVD	(SEQ ID NO: 70)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1215	NIQMTQSPSALS ASVGDRVTITC	(SEQ ID NO: 54)	KASQDI HRYLS	(SEQ ID NO: 66)	WFQQKPGK APKHLIY	(SEQ ID NO: 56)	REVRFVD	(SEQ ID NO: 71)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1216	NIQMTQSPSALS ASVGDRVTITC	(SEQ ID NO: 54)	KASQDI HRYLS	(SEQ ID NO: 66)	WFQQKPGK APKHLIY	(SEQ ID NO: 56)	REIRFVD	(SEQ ID NO: 72)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1217	NIQMTQSPSALS ASVGDRVTITC	(SEQ ID NO: 54)	KASQDI HRYLS	(SEQ ID NO: 66)	WFQQKPGK APKHLIY	(SEQ ID NO: 56)	REERFVD	(SEQ ID NO: 73)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)

[illegible]

	ASVGDRVTITC	NO: 54)	HRYLS	NO: 79)	APKHLIY	NO: 56)		NO: 69)	GTEFTLTISL QPEDFATYYC	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSALS	(SEQ ID NO: 54)	RASQDI	(SEQ ID NO: 79)	WFQKPGK	(SEQ ID NO: 56)		(SEQ ID NO: 70)	GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1227	ASVGDRVTITC	HRYLS	HRYLS	NO: 79)	APKHLIY	NO: 56)	RYSRFVD		GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	FPYT	(SEQ ID NO: 64)	VEIK	(SEQ ID NO: 11)
	NIQMTQSPSALS	(SEQ ID NO: 54)	RASQDI	(SEQ ID NO: 79)	WFQKPGK	(SEQ ID NO: 56)		(SEQ ID NO: 71)	GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1228	ASVGDRVTITC	HRYLS	HRYLS	NO: 79)	APKHLIY	NO: 56)	REVRFVD		GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	FPYT	(SEQ ID NO: 64)	VEIK	(SEQ ID NO: 11)
	NIQMTQSPSALS	(SEQ ID NO: 54)	RASQDI	(SEQ ID NO: 79)	WFQKPGK	(SEQ ID NO: 56)		(SEQ ID NO: 72)	GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1229	ASVGDRVTITC	HRYLS	HRYLS	NO: 79)	APKHLIY	NO: 56)	REIRFVD		GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	FPYT	(SEQ ID NO: 64)	VEIK	(SEQ ID NO: 11)
	NIQMTQSPSALS	(SEQ ID NO: 54)	RASQDI	(SEQ ID NO: 79)	WFQKPGK	(SEQ ID NO: 56)		(SEQ ID NO: 73)	GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1230	ASVGDRVTITC	HRYLS	HRYLS	NO: 79)	APKHLIY	NO: 56)	REERFVD		GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	FPYT	(SEQ ID NO: 64)	VEIK	(SEQ ID NO: 11)
	NIQMTQSPSALS	(SEQ ID NO: 54)	RASQDI	(SEQ ID NO: 79)	WFQKPGK	(SEQ ID NO: 56)		(SEQ ID NO: 74)	GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1231	ASVGDRVTITC	HRYLS	HRYLS	NO: 79)	APKHLIY	NO: 56)	RESRFVD		GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	FPYT	(SEQ ID NO: 64)	VEIK	(SEQ ID NO: 11)
	NIQMTQSPSALS	(SEQ ID NO: 54)	RASQDI	(SEQ ID NO: 79)	WFQKPGK	(SEQ ID NO: 56)		(SEQ ID NO: 75)	GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1232	ASVGDRVTITC	HRYLS	HRYLS	NO: 79)	APKHLIY	NO: 56)	RHVRFVD		GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	FPYT	(SEQ ID NO: 64)	VEIK	(SEQ ID NO: 11)
	NIQMTQSPSALS	(SEQ ID NO: 54)	RASQDI	(SEQ ID NO: 79)	WFQKPGK	(SEQ ID NO: 56)		(SEQ ID NO: 76)	GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1233	ASVGDRVTITC	HRYLS	HRYLS	NO: 79)	APKHLIY	NO: 56)	RHIRFVD		GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	FPYT	(SEQ ID NO: 64)	VEIK	(SEQ ID NO: 11)
	NIQMTQSPSALS	(SEQ ID NO: 54)	RASQDI	(SEQ ID NO: 79)	WFQKPGK	(SEQ ID NO: 56)		(SEQ ID NO: 77)	GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1234	ASVGDRVTITC	HRYLS	HRYLS	NO: 79)	APKHLIY	NO: 56)	RHERFVD		GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	FPYT	(SEQ ID NO: 64)	VEIK	(SEQ ID NO: 11)

Ab1235	NIQMTQSPSALS ASVGDRVTITC	(SEQ ID NO: 54)	RASQDI HRYLS	(SEQ ID NO: 79)	WFQQKPGK APKHLIY	(SEQ ID NO: 56)	RHSRFVD	(SEQ ID NO: 78)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1236	NIQMTQSPSAMS ASVGDRVTITC	(SEQ ID NO: 51)	KASQDI HRYLS	(SEQ ID NO: 66)	WYQQKPGK APKHLIY	(SEQ ID NO: 58)	RANRLVS	(SEQ ID NO: 63)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1237	NIQMTQSPSAMS ASVGDRVTITC	(SEQ ID NO: 51)	KASQDI HRYLS	(SEQ ID NO: 66)	WYQQKPGK APKHLIY	(SEQ ID NO: 58)	RYVRFVD	(SEQ ID NO: 67)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1238	NIQMTQSPSAMS ASVGDRVTITC	(SEQ ID NO: 51)	KASQDI HRYLS	(SEQ ID NO: 66)	WYQQKPGK APKHLIY	(SEQ ID NO: 58)	RYIRFVD	(SEQ ID NO: 68)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1239	NIQMTQSPSAMS ASVGDRVTITC	(SEQ ID NO: 51)	KASQDI HRYLS	(SEQ ID NO: 66)	WYQQKPGK APKHLIY	(SEQ ID NO: 58)	RYERFVD	(SEQ ID NO: 69)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1240	NIQMTQSPSAMS ASVGDRVTITC	(SEQ ID NO: 51)	KASQDI HRYLS	(SEQ ID NO: 66)	WYQQKPGK APKHLIY	(SEQ ID NO: 58)	RYSRFVD	(SEQ ID NO: 70)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1241	NIQMTQSPSAMS ASVGDRVTITC	(SEQ ID NO: 51)	KASQDI HRYLS	(SEQ ID NO: 66)	WYQQKPGK APKHLIY	(SEQ ID NO: 58)	REVRFVD	(SEQ ID NO: 71)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1242	NIQMTQSPSAMS ASVGDRVTITC	(SEQ ID NO: 51)	KASQDI HRYLS	(SEQ ID NO: 66)	WYQQKPGK APKHLIY	(SEQ ID NO: 58)	REIRFVD	(SEQ ID NO: 72)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1243	NIQMTQSPSAMS ASVGDRVTITC	(SEQ ID NO: 51)	KASQDI HRYLS	(SEQ ID NO: 66)	WYQQKPGK APKHLIY	(SEQ ID NO: 58)	REERFVD	(SEQ ID NO: 73)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)

[illegible]

	ASVGDRVTITC	NO: 51)	HRYLS	NO: 79)	APKHLIY	NO: 58)		NO: 69)	GTEFTLTISL QPEDFATYYC	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSAMS	(SEQ ID NO: 51)	RASQDI	(SEQ ID NO: 79)	WYQQKPGK	(SEQ ID NO: 58)		(SEQ ID NO: 70)	GVPSTRFSGSGS	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1253	ASVGDRVTITC	NO: 51)	HRYLS	NO: 79)	APKHLIY	NO: 58)	RYSRFVD		QPEDFATYYC	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSAMS	(SEQ ID NO: 51)	RASQDI	(SEQ ID NO: 79)	WYQQKPGK	(SEQ ID NO: 58)		(SEQ ID NO: 71)	GVPSTRFSGSGS	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1254	ASVGDRVTITC	NO: 51)	HRYLS	NO: 79)	APKHLIY	NO: 58)	REVRFVD		QPEDFATYYC	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSAMS	(SEQ ID NO: 51)	RASQDI	(SEQ ID NO: 79)	WYQQKPGK	(SEQ ID NO: 58)		(SEQ ID NO: 72)	GVPSTRFSGSGS	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1255	ASVGDRVTITC	NO: 51)	HRYLS	NO: 79)	APKHLIY	NO: 58)	REIRFVD		QPEDFATYYC	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSAMS	(SEQ ID NO: 51)	RASQDI	(SEQ ID NO: 79)	WYQQKPGK	(SEQ ID NO: 58)		(SEQ ID NO: 73)	GVPSTRFSGSGS	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1256	ASVGDRVTITC	NO: 51)	HRYLS	NO: 79)	APKHLIY	NO: 58)	REERFVD		QPEDFATYYC	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSAMS	(SEQ ID NO: 51)	RASQDI	(SEQ ID NO: 79)	WYQQKPGK	(SEQ ID NO: 58)		(SEQ ID NO: 74)	GVPSTRFSGSGS	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1257	ASVGDRVTITC	NO: 51)	HRYLS	NO: 79)	APKHLIY	NO: 58)	RESRFVD		QPEDFATYYC	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSAMS	(SEQ ID NO: 51)	RASQDI	(SEQ ID NO: 79)	WYQQKPGK	(SEQ ID NO: 58)		(SEQ ID NO: 75)	GVPSTRFSGSGS	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1258	ASVGDRVTITC	NO: 51)	HRYLS	NO: 79)	APKHLIY	NO: 58)	RHVRFVD		QPEDFATYYC	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSAMS	(SEQ ID NO: 51)	RASQDI	(SEQ ID NO: 79)	WYQQKPGK	(SEQ ID NO: 58)		(SEQ ID NO: 76)	GVPSTRFSGSGS	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1259	ASVGDRVTITC	NO: 51)	HRYLS	NO: 79)	APKHLIY	NO: 58)	RHIRFVD		QPEDFATYYC	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSAMS	(SEQ ID NO: 51)	RASQDI	(SEQ ID NO: 79)	WYQQKPGK	(SEQ ID NO: 58)		(SEQ ID NO: 77)	GVPSTRFSGSGS	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1260	ASVGDRVTITC	NO: 51)	HRYLS	NO: 79)	APKHLIY	NO: 58)	RHERFVD		QPEDFATYYC	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)

Ab1261	NIQMTQSPSAMS	(SEQ ID NO: 51)	RASQDI	(SEQ ID NO: 79)	WYQQKPGK	(SEQ ID NO: 58)	RHSRFVD	(SEQ ID NO: 78)	GVPSRFSGSGS	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
	ASVGDRVITTC		HRYLS		APKHLIY				GTEFTLTISL		FPYT		VEIK	
Ab1262	NIQMTQSPSSLS	(SEQ ID NO: 57)	KASQDI	(SEQ ID NO: 66)	WYQQKPGK	(SEQ ID NO: 55)	RANRLVS	(SEQ ID NO: 63)	GVPSRFSGSGS	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
	ASVGDRVITTC		HRYLS		VPKHLIY				QPEDFATYYC		FPYT		VEIK	
Ab1263	NIQMTQSPSSLS	(SEQ ID NO: 57)	KASQDI	(SEQ ID NO: 66)	WYQQKPGK	(SEQ ID NO: 55)		(SEQ ID NO: 67)	GVPSRFSGSGS	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
	ASVGDRVITTC		HRYLS		VPKHLIY		RYVRFVD		QPEDFATYYC		FPYT		VEIK	
Ab1264	NIQMTQSPSSLS	(SEQ ID NO: 57)	KASQDI	(SEQ ID NO: 66)	WYQQKPGK	(SEQ ID NO: 55)		(SEQ ID NO: 68)	GVPSRFSGSGS	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
	ASVGDRVITTC		HRYLS		VPKHLIY		RYIRFVD		QPEDFATYYC		FPYT		VEIK	
Ab1265	NIQMTQSPSSLS	(SEQ ID NO: 57)	KASQDI	(SEQ ID NO: 66)	WYQQKPGK	(SEQ ID NO: 55)		(SEQ ID NO: 69)	GVPSRFSGSGS	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
	ASVGDRVITTC		HRYLS		VPKHLIY		RYERFVD		QPEDFATYYC		FPYT		VEIK	
Ab1266	NIQMTQSPSSLS	(SEQ ID NO: 57)	KASQDI	(SEQ ID NO: 66)	WYQQKPGK	(SEQ ID NO: 55)		(SEQ ID NO: 70)	GVPSRFSGSGS	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
	ASVGDRVITTC		HRYLS		VPKHLIY		RYSRFVD		QPEDFATYYC		FPYT		VEIK	
Ab1267	NIQMTQSPSSLS	(SEQ ID NO: 57)	KASQDI	(SEQ ID NO: 66)	WYQQKPGK	(SEQ ID NO: 55)		(SEQ ID NO: 71)	GVPSRFSGSGS	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
	ASVGDRVITTC		HRYLS		VPKHLIY		REVRFVD		QPEDFATYYC		FPYT		VEIK	
Ab1268	NIQMTQSPSSLS	(SEQ ID NO: 57)	KASQDI	(SEQ ID NO: 66)	WYQQKPGK	(SEQ ID NO: 55)		(SEQ ID NO: 72)	GVPSRFSGSGS	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
	ASVGDRVITTC		HRYLS		VPKHLIY		REIRFVD		QPEDFATYYC		FPYT		VEIK	
Ab1269	NIQMTQSPSSLS	(SEQ ID NO: 57)	KASQDI	(SEQ ID NO: 66)	WYQQKPGK	(SEQ ID NO: 55)		(SEQ ID NO: 73)	GVPSRFSGSGS	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
	ASVGDRVITTC		HRYLS		VPKHLIY		REERFVD		GTEFTLTISL		FPYT		VEIK	

[illegible]

	ASVGDRVTITC	NO: 57)	HRYLS	NO: 79)	VPKHLIY	NO: 55)		NO: 69)	GTEFTLTISL QPEDFATYYC	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSSL	(SEQ ID NO: 57)	RASQDI	(SEQ ID NO: 79)	WYQQKPGK	(SEQ ID NO: 55)		(SEQ ID NO: 70)	GTEFTLTISL	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1279	ASVGDRVTITC	NO: 57)	HRYLS	NO: 79)	VPKHLIY	NO: 55)	RYSRFVD		QPEDFATYYC	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSSL	(SEQ ID NO: 57)	RASQDI	(SEQ ID NO: 79)	WYQQKPGK	(SEQ ID NO: 55)		(SEQ ID NO: 71)	GVPSRFSGSGS	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1280	ASVGDRVTITC	NO: 57)	HRYLS	NO: 79)	VPKHLIY	NO: 55)	REVRFVD		QPEDFATYYC	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSSL	(SEQ ID NO: 57)	RASQDI	(SEQ ID NO: 79)	WYQQKPGK	(SEQ ID NO: 55)		(SEQ ID NO: 72)	GVPSRFSGSGS	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1281	ASVGDRVTITC	NO: 57)	HRYLS	NO: 79)	VPKHLIY	NO: 55)	REIRFVD		QPEDFATYYC	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSSL	(SEQ ID NO: 57)	RASQDI	(SEQ ID NO: 79)	WYQQKPGK	(SEQ ID NO: 55)		(SEQ ID NO: 73)	GVPSRFSGSGS	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1282	ASVGDRVTITC	NO: 57)	HRYLS	NO: 79)	VPKHLIY	NO: 55)	REERFVD		QPEDFATYYC	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSSL	(SEQ ID NO: 57)	RASQDI	(SEQ ID NO: 79)	WYQQKPGK	(SEQ ID NO: 55)		(SEQ ID NO: 74)	GVPSRFSGSGS	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1283	ASVGDRVTITC	NO: 57)	HRYLS	NO: 79)	VPKHLIY	NO: 55)	RESRFVD		QPEDFATYYC	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSSL	(SEQ ID NO: 57)	RASQDI	(SEQ ID NO: 79)	WYQQKPGK	(SEQ ID NO: 55)		(SEQ ID NO: 75)	GVPSRFSGSGS	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1284	ASVGDRVTITC	NO: 57)	HRYLS	NO: 79)	VPKHLIY	NO: 55)	RHVRFVD		QPEDFATYYC	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSSL	(SEQ ID NO: 57)	RASQDI	(SEQ ID NO: 79)	WYQQKPGK	(SEQ ID NO: 55)		(SEQ ID NO: 76)	GVPSRFSGSGS	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1285	ASVGDRVTITC	NO: 57)	HRYLS	NO: 79)	VPKHLIY	NO: 55)	RHIRFVD		QPEDFATYYC	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSSL	(SEQ ID NO: 57)	RASQDI	(SEQ ID NO: 79)	WYQQKPGK	(SEQ ID NO: 55)		(SEQ ID NO: 77)	GVPSRFSGSGS	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1286	ASVGDRVTITC	NO: 57)	HRYLS	NO: 79)	VPKHLIY	NO: 55)	RHERFVD		QPEDFATYYC	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)

Ab1287	NIQMTQSPSSL ASVGDRVTITC	(SEQ ID NO: 57)	RASQDI HRYLS	(SEQ ID NO: 79)	WYQQKPGK VPKHLIY	(SEQ ID NO: 55)	RHSRFVD	(SEQ ID NO: 78)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1288	NIQMTQSPSSL ASVGDRVTITC	(SEQ ID NO: 57)	KASQDI HRYLS	(SEQ ID NO: 66)	WFQQKPGK APKHLIY	(SEQ ID NO: 56)	RANRLVS	(SEQ ID NO: 63)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1289	NIQMTQSPSSL ASVGDRVTITC	(SEQ ID NO: 57)	KASQDI HRYLS	(SEQ ID NO: 66)	WFQQKPGK APKHLIY	(SEQ ID NO: 56)	RYVRFVD	(SEQ ID NO: 67)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1290	NIQMTQSPSSL ASVGDRVTITC	(SEQ ID NO: 57)	KASQDI HRYLS	(SEQ ID NO: 66)	WFQQKPGK APKHLIY	(SEQ ID NO: 56)	RYIRFVD	(SEQ ID NO: 68)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1291	NIQMTQSPSSL ASVGDRVTITC	(SEQ ID NO: 57)	KASQDI HRYLS	(SEQ ID NO: 66)	WFQQKPGK APKHLIY	(SEQ ID NO: 56)	RYERFVD	(SEQ ID NO: 69)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1292	NIQMTQSPSSL ASVGDRVTITC	(SEQ ID NO: 57)	KASQDI HRYLS	(SEQ ID NO: 66)	WFQQKPGK APKHLIY	(SEQ ID NO: 56)	RYSRFVD	(SEQ ID NO: 70)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1293	NIQMTQSPSSL ASVGDRVTITC	(SEQ ID NO: 57)	KASQDI HRYLS	(SEQ ID NO: 66)	WFQQKPGK APKHLIY	(SEQ ID NO: 56)	REVRFVD	(SEQ ID NO: 71)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1294	NIQMTQSPSSL ASVGDRVTITC	(SEQ ID NO: 57)	KASQDI HRYLS	(SEQ ID NO: 66)	WFQQKPGK APKHLIY	(SEQ ID NO: 56)	REIRFVD	(SEQ ID NO: 72)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1295	NIQMTQSPSSL ASVGDRVTITC	(SEQ ID NO: 57)	KASQDI HRYLS	(SEQ ID NO: 66)	WFQQKPGK APKHLIY	(SEQ ID NO: 56)	REERFVD	(SEQ ID NO: 73)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)

[illegible]

	ASVGDRVTITC	NO: 57)	HRYLS	NO: 79)	APKHLIY	NO: 56)		NO: 69)	GTEFTLTISL QPEDFATYYC	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSSL	(SEQ ID NO: 57)	RASQDI	(SEQ ID NO: 79)	WFQKPGK	(SEQ ID NO: 56)		(SEQ ID NO: 70)	GTEFTLTISL	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1305	ASVGDRVTITC	HRYLS	HRYLS	NO: 79)	APKHLIY	NO: 56)	RYSRFVD		QPEDFATYYC	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSSL	(SEQ ID NO: 57)	RASQDI	(SEQ ID NO: 79)	WFQKPGK	(SEQ ID NO: 56)		(SEQ ID NO: 71)	GVPSRFSGSGS	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1306	ASVGDRVTITC	HRYLS	HRYLS	NO: 79)	APKHLIY	NO: 56)	REVRFVD		QPEDFATYYC	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSSL	(SEQ ID NO: 57)	RASQDI	(SEQ ID NO: 79)	WFQKPGK	(SEQ ID NO: 56)		(SEQ ID NO: 72)	GVPSRFSGSGS	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1307	ASVGDRVTITC	HRYLS	HRYLS	NO: 79)	APKHLIY	NO: 56)	REIRFVD		QPEDFATYYC	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSSL	(SEQ ID NO: 57)	RASQDI	(SEQ ID NO: 79)	WFQKPGK	(SEQ ID NO: 56)		(SEQ ID NO: 73)	GVPSRFSGSGS	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1308	ASVGDRVTITC	HRYLS	HRYLS	NO: 79)	APKHLIY	NO: 56)	REERFVD		QPEDFATYYC	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSSL	(SEQ ID NO: 57)	RASQDI	(SEQ ID NO: 79)	WFQKPGK	(SEQ ID NO: 56)		(SEQ ID NO: 74)	GVPSRFSGSGS	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1309	ASVGDRVTITC	HRYLS	HRYLS	NO: 79)	APKHLIY	NO: 56)	RESRFVD		QPEDFATYYC	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSSL	(SEQ ID NO: 57)	RASQDI	(SEQ ID NO: 79)	WFQKPGK	(SEQ ID NO: 56)		(SEQ ID NO: 75)	GVPSRFSGSGS	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1310	ASVGDRVTITC	HRYLS	HRYLS	NO: 79)	APKHLIY	NO: 56)	RHVRFVD		QPEDFATYYC	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSSL	(SEQ ID NO: 57)	RASQDI	(SEQ ID NO: 79)	WFQKPGK	(SEQ ID NO: 56)		(SEQ ID NO: 76)	GVPSRFSGSGS	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1311	ASVGDRVTITC	HRYLS	HRYLS	NO: 79)	APKHLIY	NO: 56)	RHIRFVD		QPEDFATYYC	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSSL	(SEQ ID NO: 57)	RASQDI	(SEQ ID NO: 79)	WFQKPGK	(SEQ ID NO: 56)		(SEQ ID NO: 77)	GVPSRFSGSGS	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1312	ASVGDRVTITC	HRYLS	HRYLS	NO: 79)	APKHLIY	NO: 56)	RHERFVD		QPEDFATYYC	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)

Ab1313	NIQMTQSPSALS ASVGDRVTITC	(SEQ ID NO: 57)	RASQDI HRYLS	(SEQ ID NO: 79)	WFQQKPGK APKHLIY	(SEQ ID NO: 56)	RHSRFVD	(SEQ ID NO: 78)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1314	NIQMTQSPSALS ASVGDRVTITC	(SEQ ID NO: 54)	KASQDI HRYLS	(SEQ ID NO: 66)	WYQQKPGK APKHLIY	(SEQ ID NO: 58)	RANRLVS	(SEQ ID NO: 63)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1315	NIQMTQSPSALS ASVGDRVTITC	(SEQ ID NO: 54)	KASQDI HRYLS	(SEQ ID NO: 66)	WYQQKPGK APKHLIY	(SEQ ID NO: 58)	RYVRFVD	(SEQ ID NO: 67)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1316	NIQMTQSPSALS ASVGDRVTITC	(SEQ ID NO: 54)	KASQDI HRYLS	(SEQ ID NO: 66)	WYQQKPGK APKHLIY	(SEQ ID NO: 58)	RYIRFVD	(SEQ ID NO: 68)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1317	NIQMTQSPSALS ASVGDRVTITC	(SEQ ID NO: 54)	KASQDI HRYLS	(SEQ ID NO: 66)	WYQQKPGK APKHLIY	(SEQ ID NO: 58)	RYERFVD	(SEQ ID NO: 69)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1318	NIQMTQSPSALS ASVGDRVTITC	(SEQ ID NO: 54)	KASQDI HRYLS	(SEQ ID NO: 66)	WYQQKPGK APKHLIY	(SEQ ID NO: 58)	RYSRFVD	(SEQ ID NO: 70)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1319	NIQMTQSPSALS ASVGDRVTITC	(SEQ ID NO: 54)	KASQDI HRYLS	(SEQ ID NO: 66)	WYQQKPGK APKHLIY	(SEQ ID NO: 58)	REVRFVD	(SEQ ID NO: 71)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1320	NIQMTQSPSALS ASVGDRVTITC	(SEQ ID NO: 54)	KASQDI HRYLS	(SEQ ID NO: 66)	WYQQKPGK APKHLIY	(SEQ ID NO: 58)	REIRFVD	(SEQ ID NO: 72)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1321	NIQMTQSPSALS ASVGDRVTITC	(SEQ ID NO: 54)	KASQDI HRYLS	(SEQ ID NO: 66)	WYQQKPGK APKHLIY	(SEQ ID NO: 58)	REERFVD	(SEQ ID NO: 73)	GVPSRFSGSGS GTEFTLTISL	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)

[illegible]

	ASVGDRVTITC	NO: 54)	HRYLS	NO: 79)	APKHLIY	NO: 58)		NO: 69)	GTEFTLTISL QPEDFATYYC	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSALS	(SEQ ID NO: 54)	RASQDI	(SEQ ID NO: 79)	WYQQKPGK	(SEQ ID NO: 58)		(SEQ ID NO: 70)	GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1331	ASVGDRVTITC	HRYLS	HRYLS	NO: 79)	APKHLIY	NO: 58)	RYSRFVD		GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	FPYT	(SEQ ID NO: 64)	VEIK	(SEQ ID NO: 11)
	NIQMTQSPSALS	(SEQ ID NO: 54)	RASQDI	(SEQ ID NO: 79)	WYQQKPGK	(SEQ ID NO: 58)		(SEQ ID NO: 71)	GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1332	ASVGDRVTITC	HRYLS	HRYLS	NO: 79)	APKHLIY	NO: 58)	REVRFVD		GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	FPYT	(SEQ ID NO: 64)	VEIK	(SEQ ID NO: 11)
	NIQMTQSPSALS	(SEQ ID NO: 54)	RASQDI	(SEQ ID NO: 79)	WYQQKPGK	(SEQ ID NO: 58)		(SEQ ID NO: 72)	GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1333	ASVGDRVTITC	HRYLS	HRYLS	NO: 79)	APKHLIY	NO: 58)	REIRFVD		GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	FPYT	(SEQ ID NO: 64)	VEIK	(SEQ ID NO: 11)
	NIQMTQSPSALS	(SEQ ID NO: 54)	RASQDI	(SEQ ID NO: 79)	WYQQKPGK	(SEQ ID NO: 58)		(SEQ ID NO: 73)	GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1334	ASVGDRVTITC	HRYLS	HRYLS	NO: 79)	APKHLIY	NO: 58)	REERFVD		GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	FPYT	(SEQ ID NO: 64)	VEIK	(SEQ ID NO: 11)
	NIQMTQSPSALS	(SEQ ID NO: 54)	RASQDI	(SEQ ID NO: 79)	WYQQKPGK	(SEQ ID NO: 58)		(SEQ ID NO: 74)	GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1335	ASVGDRVTITC	HRYLS	HRYLS	NO: 79)	APKHLIY	NO: 58)	RESRFVD		GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	FPYT	(SEQ ID NO: 64)	VEIK	(SEQ ID NO: 11)
	NIQMTQSPSALS	(SEQ ID NO: 54)	RASQDI	(SEQ ID NO: 79)	WYQQKPGK	(SEQ ID NO: 58)		(SEQ ID NO: 75)	GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1336	ASVGDRVTITC	HRYLS	HRYLS	NO: 79)	APKHLIY	NO: 58)	RHVRFVD		GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	FPYT	(SEQ ID NO: 64)	VEIK	(SEQ ID NO: 11)
	NIQMTQSPSALS	(SEQ ID NO: 54)	RASQDI	(SEQ ID NO: 79)	WYQQKPGK	(SEQ ID NO: 58)		(SEQ ID NO: 76)	GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1337	ASVGDRVTITC	HRYLS	HRYLS	NO: 79)	APKHLIY	NO: 58)	RHIRFVD		GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	FPYT	(SEQ ID NO: 64)	VEIK	(SEQ ID NO: 11)
	NIQMTQSPSALS	(SEQ ID NO: 54)	RASQDI	(SEQ ID NO: 79)	WYQQKPGK	(SEQ ID NO: 58)		(SEQ ID NO: 77)	GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1338	ASVGDRVTITC	HRYLS	HRYLS	NO: 79)	APKHLIY	NO: 58)	RHERFVD		GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	FPYT	(SEQ ID NO: 64)	VEIK	(SEQ ID NO: 11)

Ab1339	NIQMTQSPSALS ASVGDRVTITC	(SEQ ID NO: 54)	RASQDI HRYLS	(SEQ ID NO: 79)	WYQQKPGK APKHLIY	(SEQ ID NO: 58)	RHSRFVD	(SEQ ID NO: 78)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1340	NIQMTQSPSLS ASVGDRVTITC	(SEQ ID NO: 57)	KASQDI HRYLS	(SEQ ID NO: 66)	WYQQKPGK APKHLIY	(SEQ ID NO: 58)	RANRLVS	(SEQ ID NO: 63)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1341	NIQMTQSPSLS ASVGDRVTITC	(SEQ ID NO: 57)	KASQDI HRYLS	(SEQ ID NO: 66)	WYQQKPGK APKHLIY	(SEQ ID NO: 58)	RYVRFVD	(SEQ ID NO: 67)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1342	NIQMTQSPSLS ASVGDRVTITC	(SEQ ID NO: 57)	KASQDI HRYLS	(SEQ ID NO: 66)	WYQQKPGK APKHLIY	(SEQ ID NO: 58)	RYIRFVD	(SEQ ID NO: 68)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1343	NIQMTQSPSLS ASVGDRVTITC	(SEQ ID NO: 57)	KASQDI HRYLS	(SEQ ID NO: 66)	WYQQKPGK APKHLIY	(SEQ ID NO: 58)	RYERFVD	(SEQ ID NO: 69)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1344	NIQMTQSPSLS ASVGDRVTITC	(SEQ ID NO: 57)	KASQDI HRYLS	(SEQ ID NO: 66)	WYQQKPGK APKHLIY	(SEQ ID NO: 58)	RYSRFVD	(SEQ ID NO: 70)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1345	NIQMTQSPSLS ASVGDRVTITC	(SEQ ID NO: 57)	KASQDI HRYLS	(SEQ ID NO: 66)	WYQQKPGK APKHLIY	(SEQ ID NO: 58)	REVRFVD	(SEQ ID NO: 71)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1346	NIQMTQSPSLS ASVGDRVTITC	(SEQ ID NO: 57)	KASQDI HRYLS	(SEQ ID NO: 66)	WYQQKPGK APKHLIY	(SEQ ID NO: 58)	REIRFVD	(SEQ ID NO: 72)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
Ab1347	NIQMTQSPSLS ASVGDRVTITC	(SEQ ID NO: 57)	KASQDI HRYLS	(SEQ ID NO: 66)	WYQQKPGK APKHLIY	(SEQ ID NO: 58)	REERFVD	(SEQ ID NO: 73)	GVPSRFSGSGS GTEFTLTISL	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)

[illegible]

	ASVGDRVTITC	NO: 57)	HRYLS	NO: 79)	APKHLIY	NO: 58)		NO: 69)	GTEFTLTISL QPEDFATYYC	NO: 10)	FPYT	NO: 64)	VEIK	NO: 11)
	NIQMTQSPSSL	(SEQ ID NO: 57)	RASQDI	(SEQ ID NO: 79)	WYQQKPGK	(SEQ ID NO: 58)		(SEQ ID NO: 70)	GVPSRFSGSGS	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1357	ASVGDRVTITC		HRYLS		APKHLIY		RYSRFVD		QPEDFATYYC		FPYT		VEIK	
	NIQMTQSPSSL	(SEQ ID NO: 57)	RASQDI	(SEQ ID NO: 79)	WYQQKPGK	(SEQ ID NO: 58)		(SEQ ID NO: 71)	GVPSRFSGSGS	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1358	ASVGDRVTITC		HRYLS		APKHLIY		REVRFVD		QPEDFATYYC		FPYT		VEIK	
	NIQMTQSPSSL	(SEQ ID NO: 57)	RASQDI	(SEQ ID NO: 79)	WYQQKPGK	(SEQ ID NO: 58)		(SEQ ID NO: 72)	GVPSRFSGSGS	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1359	ASVGDRVTITC		HRYLS		APKHLIY		REIRFVD		QPEDFATYYC		FPYT		VEIK	
	NIQMTQSPSSL	(SEQ ID NO: 57)	RASQDI	(SEQ ID NO: 79)	WYQQKPGK	(SEQ ID NO: 58)		(SEQ ID NO: 73)	GVPSRFSGSGS	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1360	ASVGDRVTITC		HRYLS		APKHLIY		REERFVD		QPEDFATYYC		FPYT		VEIK	
	NIQMTQSPSSL	(SEQ ID NO: 57)	RASQDI	(SEQ ID NO: 79)	WYQQKPGK	(SEQ ID NO: 58)		(SEQ ID NO: 74)	GVPSRFSGSGS	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1361	ASVGDRVTITC		HRYLS		APKHLIY		RESRFVD		QPEDFATYYC		FPYT		VEIK	
	NIQMTQSPSSL	(SEQ ID NO: 57)	RASQDI	(SEQ ID NO: 79)	WYQQKPGK	(SEQ ID NO: 58)		(SEQ ID NO: 75)	GVPSRFSGSGS	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1362	ASVGDRVTITC		HRYLS		APKHLIY		RHVRFVD		QPEDFATYYC		FPYT		VEIK	
	NIQMTQSPSSL	(SEQ ID NO: 57)	RASQDI	(SEQ ID NO: 79)	WYQQKPGK	(SEQ ID NO: 58)		(SEQ ID NO: 76)	GVPSRFSGSGS	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1363	ASVGDRVTITC		HRYLS		APKHLIY		RHIRFVD		QPEDFATYYC		FPYT		VEIK	
	NIQMTQSPSSL	(SEQ ID NO: 57)	RASQDI	(SEQ ID NO: 79)	WYQQKPGK	(SEQ ID NO: 58)		(SEQ ID NO: 77)	GVPSRFSGSGS	(SEQ ID NO: 10)	LQYDE	(SEQ ID NO: 64)	FGGGTK	(SEQ ID NO: 11)
Ab1364	ASVGDRVTITC		HRYLS		APKHLIY		RHERFVD		QPEDFATYYC		FPYT		VEIK	

Ab1365	NIQMTQSPSSL ASVGDRVTITC	(SEQ ID NO: 57)	RASQDI HRYLS	(SEQ ID NO: 79)	WYQQKPGK APKHLIY	(SEQ ID NO: 58)	RHSRFVD	(SEQ ID NO: 78)	GVPSRFSGSGS GTEFTLTISL QPEDFATYYC	(SEQ ID NO: 10)	LQYDE FPYT	(SEQ ID NO: 64)	FGGGTK VEIK	(SEQ ID NO: 11)
--------	----------------------------	--------------------	-----------------	--------------------	---------------------	--------------------	---------	--------------------	---	--------------------	---------------	--------------------	----------------	--------------------

[00216] In another specific embodiment, provided herein is an antibody or antigen-binding fragment, which comprises (I) four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1 comprises the amino acid sequence listed in the second column of Table 3 for the antibody or antigen-binding fragment, VH FR2 comprises the amino acid sequence listed in the sixth column of Table 3 for the antibody or antigen-binding fragment, VH FR3 comprises the amino acid sequence listed in the 10th column of Table 3 for the antibody or antigen-binding fragment, VH FR4 comprises the amino acid sequence listed in the 14th column of Table 3 for the antibody or antigen-binding fragment, VH CDR1 comprises the amino acid sequence listed in the fourth column of Table 3 for the antibody or antigen-binding fragment, VH CDR2 comprises the amino acid sequence listed in the eighth column of Table 3 for the antibody or antigen-binding fragment, and VH CDR3 comprises the amino acid sequence listed in the 12nd column of Table 3 for the antibody or antigen-binding fragment; and (II) four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein VL FR1 comprises the amino acid sequence listed in the second column of Table 4 for the antibody or antigen-binding fragment, VL FR2 comprises the amino acid sequence listed in the sixth column of Table 4 for the antibody or antigen-binding fragment, VL FR3 comprises the amino acid sequence listed in the 10th column of Table 4 for the antibody or antigen-binding fragment, VL FR4 comprises the amino acid sequence listed in the 14th column of Table 4 for the antibody or antigen-binding fragment, VL CDR1 comprises the amino acid sequence listed in the fourth column of Table 4 for the antibody or antigen-binding fragment, VL CDR2 comprises the amino acid sequence listed in the eighth column of Table 4 for the antibody or antigen-binding fragment, and VL CDR3 comprises the amino acid sequence listed in the 12nd column of Table 4 for the antibody or antigen-binding fragment.

[00217] In another aspect, provided herein is an antibody or antigen-binding fragment thereof which specifically binds to CD47 and comprises VH CDRs described in this Section and VL CDRs described in this Section.

[00218] In another aspect, provided herein is an antibody or antigen-binding fragment thereof which specifically binds to CD47 and comprises a VH described in Section 5.1.1, VH CDRs described in this Section, and VL CDRs described in this Section.

[00219] In another aspect, provided herein is an antibody or antigen-binding fragment thereof which specifically binds to CD47 and comprises a VL described in Section 5.1.2, VH CDRs described in this Section, and VL CDRs described in this Section.

[00220] In another aspect, provided herein is an antibody or antigen-binding fragment thereof which specifically binds to CD47 and comprises a VL described in Section 5.1.1, VL described in Section 5.1.2, VH CDRs described in this Section, and VL CDRs described in this Section.

[00221] In any of the aspects and embodiments described above, the VH CDR3 can also comprise the amino acid sequence of AYGSSSYPM DY (SEQ ID NO: 125) instead of NAA YGSSSYPM DY (SEQ ID NO: 61). Thus, the amino acid sequence of the corresponding VH FR3 comprises the additional residues of NA at the C-terminus of the VH FR3 sequence described above.

[00222] In any of the aspects and embodiments described above, the VH CDR2 can also comprise the amino acid sequence of WIDPDQGDTEYAQKFQX_{H75} (SEQ ID NO: 126), wherein X_{H75} is D or G, instead of WIDPDQGDTE (SEQ ID NO: 60). Thus, the amino acid sequence of the corresponding VH FR3 is shorter by seven residues at the N-terminus relative to the VH FR3 sequence described above.

[00223] In certain embodiments, the boundaries of the CDR sequences described herein are determined according to the Kabat numbering system. In certain embodiments, the boundaries of the CDR sequences described herein are determined according to the Chothia numbering system. In certain embodiments, the boundaries of the CDR sequences described herein are determined according to the IMGT numbering system. In certain embodiments, the boundaries of the CDR sequences described herein are determined according to the ABM numbering system. However, variants of these CDR sequences that are determined according to the Kabat numbering system, the Chothia numbering scheme, the IMGT numbering system, or the ABM numbering system for determining CDRs are also contemplated. Thus, provided herein are also antibodies or antigen-binding fragments that comprise one or more variants of the CDR sequences described above that are determined according to the Kabat numbering system, the Chothia numbering scheme, the IMGT numbering system, or the ABM numbering system. Also

provided herein are antibodies or antigen-binding fragments that comprise one or more variants of the CDR sequences described above that are determined according to the Kabat numbering system, the Chothia numbering scheme, the IMGT numbering system, or the ABM numbering system, and further comprise one or more variants of the VH FR sequences described in Section 5.1.1 that are determined in accordance with the Kabat numbering system, the Chothia numbering scheme, the IMGT numbering system, or the ABM numbering system (as the case may be), and/or one or more variants of the VL FR sequences described in Section 5.1.2 that are determined in accordance with the Kabat numbering system, the Chothia numbering scheme, the IMGT numbering system, or the ABM numbering system (as the case may be).

5.2 Antibody Production

[00224] Antibodies or antigen-binding fragments thereof described herein can be produced by any method known in the art, for example, by chemical synthesis or by recombinant expression techniques.

[00225] Such methods can employ conventional techniques in molecular biology, microbiology, genetic analysis, recombinant DNA, organic chemistry, biochemistry, PCR, oligonucleotide synthesis and modification, nucleic acid hybridization, and related fields within the skill of the art. These techniques are described, for example, in the references cited herein and are fully explained in the literature. See, *e.g.*, Maniatis *et al.* (1982) Molecular Cloning: A Laboratory Manual, Cold Spring Harbor Laboratory Press; Sambrook *et al.* (1989), Molecular Cloning: A Laboratory Manual, Second Edition, Cold Spring Harbor Laboratory Press; Sambrook *et al.* (2001) Molecular Cloning: A Laboratory Manual, Cold Spring Harbor Laboratory Press, Cold Spring Harbor, NY; Ausubel *et al.*, Current Protocols in Molecular Biology, John Wiley & Sons (1987 and annual updates); Current Protocols in Immunology, John Wiley & Sons (1987 and annual updates) Gait (ed.) (1984) Oligonucleotide Synthesis: A Practical Approach, IRL Press; Eckstein (ed.) (1991) Oligonucleotides and Analogues: A Practical Approach, IRL Press; Birren *et al.* (eds.) (1999) Genome Analysis: A Laboratory Manual, Cold Spring Harbor Laboratory Press.

[00226] Monoclonal antibodies can, for example, be prepared using a wide variety of techniques known in the art including the use of hybridoma, recombinant, and phage display

technologies, or a combination thereof. For example, monoclonal antibodies can be produced using hybridoma techniques including those known in the art and taught, for example, in Harlow *et al.*, Antibodies: A Laboratory Manual, (Cold Spring Harbor Laboratory Press, 2nd ed. 1988); Hammerling *et al.*, in: Monoclonal Antibodies and T-Cell Hybridomas 563 681 (Elsevier, N.Y., 1981). The term “monoclonal antibody” as used herein is not limited to antibodies produced through hybridoma technology. For example, monoclonal antibodies can be produced recombinantly from host cells (*e.g.*, mammalian host cells such as CHO cells) engineered to express an antibody described herein or an antigen-binding fragment thereof, for example, a light chain and/or heavy chain of such an antibody.

[00227] Further, the antibodies described herein or antigen-binding fragments thereof can also be generated using various phage display methods known in the art. In phage display methods, functional antibody domains are displayed on the surface of phage particles which carry the polynucleotide sequences encoding them. Examples of phage display methods that can be used to make the antibodies described herein include those disclosed in Brinkman *et al.*, 1995, J. Immunol. Methods 182:41-50; Ames *et al.*, 1995, J. Immunol. Methods 184:177-186; Kettleborough *et al.*, 1994, Eur. J. Immunol. 24:952-958; Persic *et al.*, 1997, Gene 187:9-18; Burton *et al.*, 1994, Advances in Immunology 57:191-280; PCT Application No. PCT/GB91/O1 134; International Publication Nos. WO 90/02809, WO 91/10737, WO 92/01047, WO 92/18619, WO 93/1 1236, WO 95/15982, WO 95/20401, and WO97/13844; and U.S. Patent Nos. 5,698,426, 5,223,409, 5,403,484, 5,580,717, 5,427,908, 5,750,753, 5,821,047, 5,571,698, 5,427,908, 5,516,637, 5,780,225, 5,658,727, 5,733,743 and 5,969,108.

[00228] In specific aspects, an antibody or antigen-binding fragment thereof as provided herein can be produced using a cell-free (CF) expression system, for example, a CF expression system as known in the art, and, for example, as described in the Examples below. For example, CF expression systems can include cell-free extracts, such as S30 cell-free extracts, with DsbC, and 20 amino acids (*e.g.*, natural or non-natural), and optionally, one or more of iodoacetamide, magnesium glutamate, ammonium glutamate, mM potassium glutamate, sodium pyruvate, AMP, GMP, UMP, and CMP, sodium oxalate, putrescine, spermidine, potassium phosphate, T7 RNAP, and oxidized (GSSG) glutathione. Heavy chain plasmids and light chain plasmids are added accordingly to the CF extract composition for polypeptide production and purification.

[00229] In some aspects, the CF expression system is an *in vitro* transcription and translation system as described in Yin *et al.*, *mAbs*, 2012, 4:217-225, incorporated by reference in its entirety. In some aspects, the cell-free system utilizes a cell-free extract from a eukaryotic cell or from a prokaryotic cell. In some aspects, the prokaryotic cell is *E. coli*.

[00230] In particular embodiments, the CF expression system can utilize a system as described in US Application Publication No. US 2014/0315245, which is hereby incorporated by reference in its entirety. For example, the CF expression system can comprise a bacterial extract having an oxidative phosphorylation system and components necessary for cell free protein synthesis and, in certain embodiments, can further comprise an exogenous protein chaperone, *e.g.*, a protein disulfide isomerase (PDI), or a peptide-prolyl cis-trans isomerase. In specific embodiments, the PDI is a member of the Dsb (disulfide bond formation) family of *E. coli*, for example, DsbA or DsbC. In certain embodiments, the CF expression system comprises a cell extract of *E. coli* strain SBDG028, SBDG031, or SBDG044, as described in US Application Publication No. US 2014/0315245, which can, for example, be prepared according to Zawada *et al.*, *Biotechnology and Bioengineering* (2011) vol. 108, No. 7.

[00231] Antibodies or antigen-binding fragments thereof described herein can, for example, include chimeric antibodies. A chimeric antibody is a molecule in which different portions of the antibody are derived from different immunoglobulin molecules. For *example*, a chimeric antibody can contain a variable region of a mouse or rat monoclonal antibody fused to a constant region of a human antibody. Methods for producing chimeric antibodies are known in the art. See, *e.g.*, Morrison, 1985, *Science* 229:1202; Oi *et al.*, 1986, *BioTechniques* 4:214; Gillies *et al.*, 1989, *J. Immunol. Methods* 125:191-202; and U.S. Patent Nos. 5,807,715, 4,816,567, 4,816,397, and 6,331,415.

[00232] Antibodies or antigen-binding fragments produced using techniques such as those described herein can be isolated using standard, well known techniques. For example, antibodies or antigen-binding fragments can be suitably separated from, *e.g.*, culture medium, ascites fluid, serum, cell lysate, synthesis reaction material or the like by conventional immunoglobulin purification procedures such as, for example, protein A-Sepharose, hydroxylapatite chromatography, gel electrophoresis, dialysis, or affinity chromatography. As used herein, an “isolated” or “purified” antibody is substantially free of cellular material or other proteins from

the cell or tissue source from which the antibody is derived, or substantially free of chemical precursors or other chemicals when chemically synthesized, or from the components of the CF expression system used to produce the antibodies.

[00233] Antibodies or antigen-binding fragments thereof described herein include antibody fragments can be generated by any technique known to those of skill in the *art*. For example, Fab and F(ab')₂ fragments described herein can be produced by proteolytic cleavage of immunoglobulin molecules, using enzymes such as papain (to produce Fab fragments) or pepsin (to produce F(ab')₂ fragments). A Fab fragment corresponds to one of the two identical arms of an antibody molecule and contains the complete light chain paired with the VH and CH1 domains of the heavy chain. A F(ab')₂ fragment contains the two antigen-binding arms of an antibody molecule linked by disulfide bonds in the hinge region. Alternatively, antibody fragments described herein can routinely be produced via well known recombinant expression techniques. *See, e.g.*, PCT publication No. WO 92/22324; Mullinax *et al.*, 1992, *BioTechniques* 12(6):864-869; Sawai *et al.*, 1995, *AJRI* 34:26-34; and Better *et al.*, 1988, *Science* 240:1041-1043.

[00234] Antibodies or antigen-binding fragments thereof described herein can, for example, include humanized antibodies, *e.g.*, deimmunized or composite human antibodies. A humanized antibody can comprise human constant region sequences. In certain embodiments, a humanized antibody can be selected from any class of immunoglobulins, including IgM, IgG, IgD, IgA and IgE, and any isotype, including IgG₁, IgG₂, IgG₃ and IgG₄. In certain embodiments, a humanized antibody can comprise kappa or lambda light chain constant sequences.

[00235] Humanized antibodies can be produced using a variety of techniques known in the art, including but not limited to, CDR-grafting (European Patent No. EP 239,400; International publication No. WO 91/09967; and U.S. Patent Nos. 5,225,539, 5,530,101, and 5,585,089), veneering or resurfacing (European Patent Nos. EP 592,106 and EP 519,596; Padlan, 1991, *Molecular Immunology* 28(4/5):489-498; Studnicka *et al.*, 1994, *Protein Engineering* 7(6):805-814; and Roguska *et al.*, 1994, *PNAS* 91:969-973), chain shuffling (U.S. Patent No. 5,565,332), and techniques disclosed in, *e.g.*, U.S. Pat. No. 6,407,213, U.S. Pat. No. 5,766,886, WO 9317105, Tan *et al.*, *J. Immunol.* 169:1119-1125 (2002), Caldas *et al.*, *Protein Eng.* 13(5):353-60 (2000), Morea *et al.*, *Methods* 20(3):267-79 (2000), Baca *et al.*, *J. Biol. Chem.* 272(16):10678-84 (1997),

Roguska *et al.*, Protein Eng. 9(10):895-904 (1996), Couto *et al.*, Cancer Res. 55 (23 Supp):5973s-5977s (1995), Couto *et al.*, Cancer Res. 55(8):1717-22 (1995), Sandhu JS, Gene 150(2):409-10 (1994), and Pedersen *et al.*, J. Mol. Biol. 235(3):959-73 (1994). See also U.S. Patent Pub. No. US 2005/0042664 A1 (Feb. 24, 2005), each of which is incorporated by reference herein in its entirety.

[00236] A composite human antibody can be generated using, for example, Composite Human Antibody™ technology (Antitope Ltd., Cambridge, United Kingdom). To generate composite human antibodies, variable region sequences are designed from fragments of multiple human antibody variable region sequences in a manner that avoids T cell epitopes, thereby minimizing the immunogenicity of the resulting antibody. Such antibodies can comprise human constant region sequences, *e.g.*, human light chain and/or heavy chain constant regions.

[00237] Antibodies or antigen-binding fragments thereof described herein can, for example, be multispecific, *e.g.*, bispecific, antibodies. Methods for making multispecific (*e.g.*, bispecific antibodies) have been described, see, for example, U.S. Patent Nos. 7951917, 7183076, 8227577, 5837242, 5989830, 5869620, 6132992, and 8586713.

[00238] Single domain antibodies, for example, antibodies lacking the light chains, can be produced by methods well-known in the art. See Riechmann *et al.*, 1999, J. Immunol. 231:25-38; Nuttall *et al.*, 2000, Curr. Pharm. Biotechnol. 1(3):253-263; Muylderman, 2001, J. Biotechnol. 74(4):277302; U.S. Patent No. 6,005,079; and International Publication Nos. WO 94/04678, WO 94/25591, and WO 01/44301.

[00239] Human antibodies can be produced using any method known in the art. For example, well known transgenic mice which are incapable of expressing functional endogenous murine immunoglobulins, but which can express human immunoglobulin genes, can be used. Alternatively, for example, phage display techniques, described above, can be utilized. Moreover, in some embodiments, human antibodies can, for example, be produced using mouse-human hybridomas. For example, human peripheral blood lymphocytes transformed with Epstein-Barr virus (EBV) can be fused with mouse myeloma cells to produce mouse-human hybridomas secreting human monoclonal antibodies, and these mouse-human hybridomas can be screened to determine ones which secrete human monoclonal antibodies that immunospecifically bind to a target antigen. Such methods are known and are described in the

art, see, *e.g.*, Shinmoto *et al.*, Cytotechnology, 2004, 46:19-23; Naganawa *et al.*, Human Antibodies, 2005, 14:27-31.

[00240] Antibody variable domains with the desired binding specificities (antibody-antigen combining sites) can be fused to immunoglobulin constant domain sequences. The fusion preferably is with an immunoglobulin heavy-chain constant domain, comprising at least part of the hinge, CH2, and CH3 regions. It is preferred to have the first heavy-chain constant region (CH1) containing the site necessary for light-chain binding present in at least one of the fusions. DNAs encoding the immunoglobulin heavy-chain fusions and, if desired, the immunoglobulin light chain, are inserted into separate expression vectors, and are co-transfected into a suitable host organism. For further details of generating bispecific antibodies see, for example, Suresh *et al.*, Methods in Enzymology, 121:210 (1986).

[00241] According to another approach described in International Application Publication No. WO 96/27011, the interface between a pair of antibody molecules can be engineered to maximize the percentage of heterodimers which are recovered from recombinant cell culture. The preferred interface comprises at least a part of the CH3 region of an antibody constant domain. In this method, one or more small amino acid side chains from the interface of the first antibody molecule are replaced with larger side chains (*e.g.* tyrosine or tryptophan). Compensatory “cavities” of identical or similar size to the large side chain(s) are created on the interface of the second antibody molecule by replacing large amino acid side chains with smaller ones (*e.g.* alanine or threonine). This provides a mechanism for increasing the yield of the heterodimer over other unwanted end-products such as homodimers.

[00242] Bispecific antibodies can be prepared as full length antibodies or antibody fragments (*e.g.* F(ab')₂ bispecific antibodies). Techniques for generating bispecific antibodies from antibody fragments have been described in the literature. For example, bispecific antibodies can be prepared using chemical linkage. Brennan *et al.*, Science 229:81 (1985) describe a procedure wherein intact antibodies are proteolytically cleaved to generate F(ab')₂ fragments. These fragments are reduced in the presence of the dithiol complexing agent sodium arsenite to stabilize vicinal dithiols and prevent intermolecular disulfide formation. The Fab' fragments generated are then converted to thionitrobenzoate (TNB) derivatives. One of the Fab'-TNB derivatives is then reconverted to the Fab'-thiol by reduction with mercaptoethylamine and is

mixed with an equimolar amount of the other Fab'-TNB derivative to form the bispecific antibody. The bispecific antibodies produced can be used as agents for the selective immobilization of enzymes.

5.2.1 Polynucleotides, Cells and Vectors

[00243] In certain aspects, provided herein are polynucleotides comprising a nucleotide sequence encoding an antibody or an antigen-binding fragment thereof described herein (*e.g.*, a variable light chain region and/or variable heavy chain region), and vectors, *e.g.*, vectors comprising such polynucleotides for recombinant expression in host cells (*e.g.*, *E. coli* and mammalian cells). In certain aspects, provided herein are cells (*e.g.*, host cells) that express such antibodies or antigen-binding fragments. Also provided herein are methods of making the antibodies or antigen-binding fragments thereof described herein.

[00244] In certain aspects, provided herein are polynucleotides comprising a nucleotide sequence encoding the light chain or heavy chain of an antibody described herein. In certain embodiments, provided herein are polynucleotides comprising a nucleotide sequence encoding the light chain and heavy chain of an antibody described herein. The polynucleotides can comprise nucleotide sequences encoding a light chain comprising the VL FRs and CDRs of antibodies described herein. The polynucleotides can comprise nucleotide sequences encoding a heavy chain comprising the VH FRs and CDRs of antibodies described herein.

[00245] In certain embodiments, a polynucleotide provided herein is linked to a promoter and/or other polynucleotide regulatory element for expression of such polynucleotide sequence in a host cell. In certain embodiments, the promoter is derived from the genome of mammalian cells (*e.g.*, metallothionein promoter) or from mammalian viruses (*e.g.*, the adenovirus late promoter, the vaccinia virus 7.5K promoter). In a specific embodiment, the expression of nucleotide sequences encoding antibodies described herein is regulated by a constitutive promoter, inducible promoter or tissue specific promoter.

[00246] In specific aspects, provided herein is a polynucleotide comprising a nucleotide sequence encoding an antibody comprising a light chain and a heavy chain, *e.g.*, a separate light chain and heavy chain. With respect to the light chain, in a specific embodiment, a polynucleotide provided herein comprises a nucleotide sequence encoding a kappa light chain. In another specific embodiment, a polynucleotide provided herein comprises a nucleotide

sequence encoding a lambda light chain. In yet another specific embodiment, a polynucleotide provided herein comprises a nucleotide sequence encoding an antibody described herein comprising a human kappa light chain or a human lambda light chain. For example, human constant region sequences can be those described in U.S. Patent No. 5,693,780.

[00247] In a particular embodiment, a polynucleotide provided herein comprises a nucleotide sequence encoding an antibody or antigen-binding fragment thereof described herein, wherein the antibody or antigen-binding fragment thereof comprises a heavy chain, wherein the constant region of the heavy chain comprises the amino acid sequence of a human gamma (γ) heavy chain constant region, for example, human gamma (γ) 1 heavy chain constant region, human gamma (γ) 2 heavy chain constant region, human gamma (γ) 3 heavy chain constant region, or human gamma (γ) 4 heavy chain constant region.

[00248] The polynucleotides described herein can be produced and the nucleotide sequences of the polynucleotides determined, by any method known in the art. Nucleotide sequences encoding antibodies described herein can be determined using methods well known in the art, *e.g.*, nucleotide codons known to encode particular amino acids can be identified and assembled in such a way to generate a nucleic acid that encodes the antibody or antigen-binding fragment thereof. Such a polynucleotide encoding the antibody or antigen-binding fragment thereof can be assembled from chemically synthesized oligonucleotides (*e.g.*, as described in Kutmeier *et al.*, 1994, *BioTechniques* 17:242), which, briefly, involves the synthesis of overlapping oligonucleotides containing portions of the sequence encoding the antibody or antigen-binding fragment thereof, annealing and ligating of those oligonucleotides, and then amplification of the ligated oligonucleotides by PCR. Alternatively, a polynucleotide encoding an antibody or antigen-binding fragment thereof described herein can be generated from nucleic acid or nucleic acids using methods well known in the art (*e.g.*, PCR and other molecular cloning methods).

[00249] In certain aspects, provided herein are vectors (*e.g.*, expression vectors) comprising a polynucleotide comprising a nucleotide sequence encoding an antibody or an antigen-binding fragment thereof described herein, *e.g.*, for recombinant expression in host cells (*e.g.*, in mammalian cells such as CHO cells) or a CF system.

[00250] Also provided herein are isolated cells (*e.g.*, host cells) comprising a polynucleotide described herein. Also provided herein are isolated cells (*e.g.*, host cells) comprising a vector

described herein. Also provided herein are isolated cells (*e.g.*, host cells) comprising an antibody or an antigen-binding fragment thereof described herein.

[00251] In a particular aspect, provided herein are methods for producing an antibody or antigen-binding fragment thereof described herein, comprising expressing such an antibody or antigen-binding fragment thereof using isolated cells (*e.g.*, host cells). In a specific embodiment, provided herein is a method of making an antibody or antigen-binding fragment thereof, comprising (a) culturing an isolated cell comprising the polynucleotide described herein; and (b) isolating the antibody or antigen-binding fragment thereof. In another specific embodiment, provided herein is a method of making an antibody or antigen-binding fragment thereof, comprising (a) culturing an isolated cell described herein; and (b) isolating the antibody or antigen-binding fragment thereof.

[00252] Recombinant expression of an antibody or antigen-binding fragment thereof described herein (*e.g.*, a full-length antibody, heavy and/or light chain of an antibody, or a single chain antibody described herein) involves construction of an expression vector containing a polynucleotide that encodes the antibody or antigen-binding fragment thereof. Once a polynucleotide encoding an antibody molecule, heavy and/or light chain of an antibody, or a fragment thereof (*e.g.*, heavy and/or light chain variable domains) described herein has been obtained, the vector for the production of the antibody molecule, heavy and/or light chain, or a fragment thereof, can be produced by recombinant DNA technology using techniques well-known in the art. Thus, methods for preparing a protein by expressing a polynucleotide containing an antibody or antibody fragment (*e.g.*, light chain or heavy chain) encoding nucleotide sequence are described herein. Methods which are well known to those skilled in the art can be used to construct expression vectors containing antibody or antigen-binding fragment (*e.g.*, light chain or heavy chain) coding sequences and appropriate transcriptional and translational control signals. These methods include, for example, *in vitro* recombinant DNA techniques, synthetic techniques, and *in vivo* genetic recombination. Also provided are replicable vectors comprising a nucleotide sequence encoding an antibody molecule described herein, a heavy or light chain of an antibody, a heavy or light chain variable domain of an antibody or a fragment thereof, or a heavy or light chain CDR, operably linked to a promoter. Such vectors can, for example, include the nucleotide sequence encoding the constant region of the antibody molecule (see, *e.g.*, International Application Publication Nos. WO 86/05807 and

WO 89/01036; and U.S. Patent No. 5,122,464) and variable domains of the antibody can be cloned into such a vector for expression of the entire heavy, the entire light chain, or both the entire heavy and light chains.

[00253] An expression vector can be transferred to a cell (*e.g.*, host cell) by conventional techniques and the resulting cells can then be cultured by conventional techniques to produce an antibody described herein or an antigen-binding fragment thereof. Thus, provided herein are host cells containing a polynucleotide encoding an antibody described herein or fragments thereof, or a heavy or light chain thereof, or fragment thereof, or a single chain antibody described herein, operably linked to a promoter for expression of such sequences in the host cell. In certain embodiments, for the expression of double-chained antibodies, vectors encoding both the heavy and light chains, individually, can be co-expressed in the host cell for expression of the entire immunoglobulin molecule, as detailed below. In certain embodiments, a host cell contains a vector comprising a polynucleotide encoding both the heavy chain and light chain of an antibody described herein, or a fragment thereof. In specific embodiments, a host cell contains two different vectors, a first vector comprising a polynucleotide encoding a heavy chain or a heavy chain variable region of an antibody described herein, or a fragment thereof, and a second vector comprising a polynucleotide encoding a light chain or a light chain variable region of an antibody described herein, or a fragment thereof. In other embodiments, a first host cell comprises a first vector comprising a polynucleotide encoding a heavy chain or a heavy chain variable region of an antibody described herein, or a fragment thereof, and a second host cell comprises a second vector comprising a polynucleotide encoding a light chain or a light chain variable region of an antibody described herein. In specific embodiments, a heavy chain/heavy chain variable region expressed by a first cell associated with a light chain/light chain variable region of a second cell to form an antibody described herein or an antigen-binding fragment thereof. In certain embodiments, provided herein is a population of host cells comprising such first host cell and such second host cell.

[00254] In a particular embodiment, provided herein is a population of vectors comprising a first vector comprising a polynucleotide encoding a light chain/light chain variable region of an antibody described herein, and a second vector comprising a polynucleotide encoding a heavy chain/heavy chain variable region of an antibody described herein.

[00255] A variety of host-expression vector systems can be utilized to express antibody molecules described herein (see, *e.g.*, U.S. Patent No. 5,807,715). Such host-expression systems represent vehicles by which the coding sequences of interest can be produced and subsequently purified, but also represent cells which can, when transformed or transfected with the appropriate nucleotide coding sequences, express an antibody molecule described herein *in situ*. These include but are not limited to microorganisms such as bacteria (*e.g.*, *E. coli* and *B. subtilis*) transformed with recombinant bacteriophage DNA, plasmid DNA or cosmid DNA expression vectors containing antibody coding sequences; yeast (*e.g.*, *Saccharomyces Pichia*) transformed with recombinant yeast expression vectors containing antibody coding sequences; insect cell systems infected with recombinant virus expression vectors (*e.g.*, baculovirus) containing antibody coding sequences; plant cell systems (*e.g.*, green algae such as *Chlamydomonas reinhardtii*) infected with recombinant virus expression vectors (*e.g.*, cauliflower mosaic virus, CaMV; tobacco mosaic virus, TMV) or transformed with recombinant plasmid expression vectors (*e.g.*, Ti plasmid) containing antibody coding sequences; or mammalian cell systems (*e.g.*, COS, CHO, BHK, MDCK, HEK 293, NS0, PER.C6, VERO, CRL7030, HsS78Bst, HeLa, and NIH 3T3 cells) harboring recombinant expression constructs containing promoters derived from the genome of mammalian cells (*e.g.*, metallothionein promoter) or from mammalian viruses (*e.g.*, the adenovirus late promoter; the vaccinia virus 7.5K promoter). In a specific embodiment, cells for expressing antibodies described herein or an antigen-binding fragment thereof are CHO cells, for example CHO cells from the CHO GS System™ (Lonza). In a specific embodiment, a mammalian expression vector is pOptiVEC™ or pcDNA3.3. In a particular embodiment, bacterial cells such as *Escherichia coli*, or eukaryotic cells (*e.g.*, mammalian cells), especially for the expression of whole recombinant antibody molecule, are used for the expression of a recombinant antibody molecule. For example, mammalian cells such as Chinese hamster ovary (CHO) cells, in conjunction with a vector such as the major intermediate early gene promoter element from human cytomegalovirus is an effective expression system for antibodies (Foecking *et al.*, 1986, Gene 45:101; and Cockett *et al.*, 1990, Bio/Technology 8:2). In certain embodiments, antibodies described herein are produced by CHO cells or NS0 cells. In a specific embodiment, the expression of nucleotide sequences encoding antibodies or antigen-binding fragments thereof described herein is regulated by a constitutive promoter, inducible promoter or tissue specific promoter.

[00256] In bacterial systems, a number of expression vectors can be advantageously selected depending upon the use intended for the antibody molecule being expressed. For example, when a large quantity of such an antibody is to be produced, for the generation of pharmaceutical compositions of an antibody molecule, vectors which direct the expression of high levels of fusion protein products that are readily purified can be desirable. Such vectors include, but are not limited to, the *E. coli* expression vector pUR278 (Ruther *et al.*, 1983, EMBO 12:1791), in which the antibody coding sequence can be ligated individually into the vector in frame with the lac Z coding region so that a fusion protein is produced; pIN vectors (Inouye & Inouye, 1985, Nucleic Acids Res. 13:3101-3109; Van Heeke & Schuster, 1989, J. Biol. Chem. 24:5503-5509); and the like. For example, pGEX vectors can also be used to express foreign polypeptides as fusion proteins with glutathione S-transferase (GST). In general, such fusion proteins are soluble and can easily be purified from lysed cells by adsorption and binding to matrix glutathione agarose beads followed by elution in the presence of free glutathione. The pGEX vectors are designed to include thrombin or factor Xa protease cleavage sites so that the cloned target gene product can be released from the GST moiety.

[00257] In an insect system, *Autographa californica* nuclear polyhedrosis virus (AcNPV), for example, can be used as a vector to express foreign genes. The virus grows in *Spodoptera frugiperda* cells. The antibody coding sequence can be cloned individually into non-essential regions (for example the polyhedrin gene) of the virus and placed under control of an AcNPV promoter (for example the polyhedrin promoter).

[00258] In mammalian host cells, a number of viral-based expression systems can be utilized. In cases where an adenovirus is used as an expression vector, the antibody coding sequence of interest can be ligated to an adenovirus transcription/translation control complex, *e.g.*, the late promoter and tripartite leader sequence. This chimeric gene can then be inserted in the adenovirus genome by *in vitro* or *in vivo* recombination. Insertion in a non-essential region of the viral genome (*e.g.*, region E1 or E3) will result in a recombinant virus that is viable and capable of expressing the antibody molecule in infected hosts (*e.g.*, see Logan & Shenk, 1984, Proc. Natl. Acad. Sci. USA 81:355-359). Specific initiation signals can also be required for efficient translation of inserted antibody coding sequences. These signals include the ATG initiation codon and adjacent sequences. Furthermore, the initiation codon must be in phase with the reading frame of the desired coding sequence to ensure translation of the entire insert. These

exogenous translational control signals and initiation codons can be of a variety of origins, both natural and synthetic. The efficiency of expression can be enhanced by the inclusion of appropriate transcription enhancer elements, transcription terminators, *etc.* (see, *e.g.*, Bittner *et al.*, 1987, Methods in Enzymol. 153:51-544).

[00259] In addition, a host cell strain can be chosen which modulates the expression of the inserted sequences, or modifies and processes the gene product in the specific fashion desired. Such modifications (*e.g.*, glycosylation) and processing (*e.g.*, cleavage) of protein products can be important for the function of the protein. Different host cells have characteristic and specific mechanisms for the post-translational processing and modification of proteins and gene products. Appropriate cell lines or host systems can be chosen to ensure the correct modification and processing of the foreign protein expressed. To this end, eukaryotic host cells which possess the cellular machinery for proper processing of the primary transcript, glycosylation, and phosphorylation of the gene product can be used. Such mammalian host cells include but are not limited to CHO, VERO, BHK, Hela, COS, MDCK, HEK 293, NIH 3T3, W138, BT483, Hs578T, HTB2, BT2O and T47D, NS0 (a murine myeloma cell line that does not endogenously produce any immunoglobulin chains), CRL7O3O and HsS78Bst cells. In certain embodiments, antibodies or antigen-binding fragments thereof described herein are produced in mammalian cells, such as CHO cells.

[00260] For long-term, high-yield production of recombinant proteins, stable expression cells can be generated. For example, cell lines which stably express an antibody described herein or an antigen-binding fragment thereof can be engineered. In specific embodiments, a cell provided herein stably expresses a light chain/light chain variable domain and a heavy chain/heavy chain variable domain which associate to form an antibody described herein or an antigen-binding fragment thereof.

[00261] In certain aspects, rather than using expression vectors which contain viral origins of replication, host cells can be transformed with DNA controlled by appropriate expression control elements (*e.g.*, promoter, enhancer, sequences, transcription terminators, polyadenylation sites, *etc.*), and a selectable marker. Following the introduction of the foreign DNA/polynucleotide, engineered cells can be allowed to grow for 1-2 days in an enriched media, and then are switched to a selective media. The selectable marker in the recombinant plasmid confers resistance to the

selection and allows cells to stably integrate the plasmid into their chromosomes and grow to form foci which in turn can be cloned and expanded into cell lines. This method can advantageously be used to engineer cell lines which express an antibody or antigen-binding fragment thereof described herein. Such engineered cell lines can be particularly useful in screening and evaluation of compositions that interact directly or indirectly with the antibody molecule.

[00262] A number of selection systems can be used, including but not limited to, the herpes simplex virus thymidine kinase (Wigler *et al.*, 1977, Cell 11:223), hypoxanthineguanine phosphoribosyltransferase (Szybalska & Szybalski, 1992, Proc. Natl. Acad. Sci. USA 48:202), and adenine phosphoribosyltransferase (Lowy *et al.*, 1980, Cell 22:8-17) genes can be employed in tk-, hgp^{rt}- or ap^{rt}-cells, respectively. Also, antimetabolite resistance can be used as the basis of selection for the following genes: *dhfr*, which confers resistance to methotrexate (Wigler *et al.*, 1980, Natl. Acad. Sci. USA 77:357; O'Hare *et al.*, 1981, Proc. Natl. Acad. Sci. USA 78:1527); *gpt*, which confers resistance to mycophenolic acid (Mulligan & Berg, 1981, Proc. Natl. Acad. Sci. USA 78:2072); neo, which confers resistance to the aminoglycoside G-418 (Wu and Wu, 1991, Biotherapy 3:87-95; Tolstoshev, 1993, Ann. Rev. Pharmacol. Toxicol. 32:573-596; Mulligan, 1993, Science 260:926-932; and Morgan and Anderson, 1993, Ann. Rev. Biochem. 62:191-217; May, 1993, TIB TECH 11(5):155-2 15); and *hygro*, which confers resistance to hygromycin (Santerre *et al.*, 1984, Gene 30:147). Methods commonly known in the art of recombinant DNA technology can be routinely applied to select the desired recombinant clone, and such methods are described, for example, in Ausubel *et al.* (eds.), Current Protocols in Molecular Biology, John Wiley & Sons, NY (1993); Kriegler, Gene Transfer and Expression, A Laboratory Manual, Stockton Press, NY (1990); and in Chapters 12 and 13, Dracopoli *et al.* (eds.), Current Protocols in Human Genetics, John Wiley & Sons, NY (1994); Colberre-Garapin *et al.*, 1981, J. Mol. Biol. 150:1, which are incorporated by reference herein in their entireties.

[00263] The expression levels of an antibody molecule can be increased by vector amplification (for a review, see Bebbington and Hentschel, The use of vectors based on gene amplification for the expression of cloned genes in mammalian cells in DNA cloning, Vol. 3 (Academic Press, New York, 1987)). When a marker in the vector system expressing antibody is amplifiable, increase in the level of inhibitor present in culture of host cell will increase the

number of copies of the marker gene. Since the amplified region is associated with the antibody gene, production of the antibody will also increase (Crouse *et al.*, 1983, Mol. Cell. Biol. 3:257).

[00264] The host cell can be co-transfected with two or more expression vectors described herein, the first vector encoding a heavy chain derived polypeptide and the second vector encoding a light chain derived polypeptide. The two vectors can contain identical selectable markers which enable equal expression of heavy and light chain polypeptides. The host cells can be co-transfected with different amounts of the two or more expression vectors. For example, host cells can be transfected with any one of the following ratios of a first expression vector and a second expression vector: 1:1, 1:2, 1:3, 1:4, 1:5, 1:6, 1:7, 1:8, 1:9, 1:10, 1:12, 1:15, 1:20, 1:25, 1:30, 1:35, 1:40, 1:45, or 1:50.

[00265] Alternatively, a single vector can be used which encodes, and is capable of expressing, both heavy and light chain polypeptides. In such situations, the light chain should be placed before the heavy chain to avoid an excess of toxic free heavy chain (Proudfoot, 1986, Nature 322:52; and Kohler, 1980, Proc. Natl. Acad. Sci. USA 77:2197-2199). The coding sequences for the heavy and light chains can comprise cDNA or genomic DNA. The expression vector can be monocistronic or multicistronic. A multicistronic nucleic acid construct can encode 2, 3, 4, 5, 6, 7, 8, 9, 10 or more, or in the range of 2-5, 5-10 or 10-20 genes/nucleotide sequences. For example, a bicistronic nucleic acid construct can comprise in the following order a promoter, a first gene (*e.g.*, heavy chain of an antibody described herein), and a second gene and (*e.g.*, light chain of an antibody described herein). In such an expression vector, the transcription of both genes can be driven by the promoter, whereas the translation of the mRNA from the first gene can be by a cap-dependent scanning mechanism and the translation of the mRNA from the second gene can be by a cap-independent mechanism, *e.g.*, by an IRES.

[00266] Once an antibody or antigen-binding fragment thereof described herein has been produced by recombinant expression, it can be purified by any method known in the art for purification of an immunoglobulin molecule, for example, by chromatography (*e.g.*, ion exchange, affinity, particularly by affinity for the specific antigen after Protein A, and sizing column chromatography), centrifugation, differential solubility, or by any other standard technique for the purification of proteins. Further, the antibodies or antigen-binding fragments

thereof described herein can be fused to heterologous polypeptide sequences described herein or otherwise known in the art to facilitate purification.

[00267] In specific embodiments, an antibody or antigen-binding fragment described herein is isolated or purified. Generally, an isolated antibody is one that is substantially free of other antibodies with different antigenic specificities than the isolated antibody. For example, in a particular embodiment, a preparation of an antibody described herein is substantially free of cellular material and/or chemical precursors. The language “substantially free of cellular material” includes preparations of an antibody in which the antibody is separated from cellular components of the cells from which it is isolated or recombinantly produced. Thus, an antibody that is substantially free of cellular material includes preparations of antibody having less than about 30%, 20%, 10%, 5%, 2%, 1%, 0.5%, or 0.1% (by dry weight) of heterologous protein (also referred to herein as a “contaminating protein”) and/or variants of an antibody, for example, different post-translational modified forms of an antibody or other different versions of an antibody (*e.g.*, antibody fragments). When the antibody is recombinantly produced, it is also generally substantially free of culture medium, *i.e.*, culture medium represents less than about 20%, 10%, 2%, 1%, 0.5%, or 0.1% of the volume of the protein preparation. When the antibody is produced by chemical synthesis, it is generally substantially free of chemical precursors or other chemicals, *i.e.*, it is separated from chemical precursors or other chemicals which are involved in the synthesis of the protein. Accordingly, such preparations of the antibody have less than about 30%, 20%, 10%, or 5% (by dry weight) of chemical precursors or compounds other than the antibody of interest. In a specific embodiment, antibodies described herein are isolated or purified.

5.3 Pharmaceutical Compositions and Kits

[00268] Provided herein are compositions, pharmaceutical compositions, and kits comprising one or more antibodies described herein, or antigen-binding fragments thereof, or conjugates thereof. In particular aspects, compositions (*e.g.*, pharmaceutical compositions) described herein can be for *in vitro*, *in vivo*, or *ex vivo* uses. Non-limiting examples of uses include uses to modulate (*e.g.*, inhibit or induce/enhance) antigen activity and uses to manage or treat a disorder, for example, cancer. In specific embodiments, provided herein is a pharmaceutical composition comprising a therapeutically effective amount of an antibody (*e.g.*, a humanized antibody) or

antigen-binding fragment thereof described and a pharmaceutically acceptable carrier or excipient.

[00269] As used herein, the term “pharmaceutically acceptable” means being approved by a regulatory agency of the Federal or a state government, or listed in the U.S. Pharmacopeia, European Pharmacopeia or other generally recognized Pharmacopeia for use in animals, and more particularly in humans.

[00270] Formulations containing one or more antibodies provided herein or an antigen-binding fragment thereof can be prepared for storage by mixing the antibody having the desired degree of purity with optional physiologically acceptable carriers, excipients or stabilizers (Remington’s Pharmaceutical Sciences (1990) Mack Publishing Co., Easton, PA; Remington: The Science and Practice of Pharmacy, 21st ed. (2006) Lippincott Williams & Wilkins, Baltimore, MD). Such formulations can, for example, be in the form of, *e.g.*, lyophilized formulations or aqueous solutions. Pharmaceutical carriers suitable for administration of the antibodies provided herein include any such carriers known to those skilled in the art to be suitable for the particular mode of administration. Acceptable carriers, excipients, or stabilizers are nontoxic to recipients at *the* dosages and concentrations employed, and include buffers such as phosphate, citrate, and other organic acids; and/or non-ionic surfactants such as TWEEN™, PLURONICS™ or polyethylene glycol (PEG).

[00271] Formulations to be used for *in vivo* administration can be sterile. This can be readily accomplished, for example, by filtration through, *e.g.*, sterile filtration membranes.

[00272] In specific aspects, the pharmaceutical compositions provided herein contain therapeutically effective amounts of one or more of the antibodies or antigen-binding fragments provided herein in a pharmaceutically acceptable carrier. Such pharmaceutical compositions are useful in the prevention, treatment, management or amelioration of a condition or disorder described herein or one or more symptoms thereof.

[00273] Compositions provided herein can contain one or more antibodies provided herein or an antigen-binding fragment thereof. In one embodiment, compositions are provided wherein antibodies or antigen-binding fragments described herein are formulated into suitable pharmaceutical preparations, such as solutions, suspensions, powders, sustained release

formulations or elixirs in sterile solutions or suspensions for parenteral administration, or as transdermal patch preparation and dry powder inhalers.

[00274] In one embodiment, compositions provided herein are formulated for single dosage administration. To formulate a composition, the weight fraction of compound is dissolved, suspended, dispersed or otherwise mixed in a selected carrier at an effective concentration such that the treated condition is relieved, prevented, or one or more symptoms are ameliorated.

[00275] In certain aspects, an antibody provided herein is included in the pharmaceutically acceptable carrier in an effective amount sufficient to exert a therapeutically useful effect in the absence of, or with minimal or negligible, undesirable side effects on the patient treated.

[00276] Concentrations of the antibody in a pharmaceutical composition provided herein will depend on, *e.g.*, the physicochemical characteristics of the antibody, the dosage schedule, and amount administered as well as other factors.

[00277] Pharmaceutical compositions described herein are provided for administration to humans or animals (*e.g.*, mammals) in unit dosage forms, such as sterile parenteral (*e.g.*, intravenous) solutions or suspensions containing suitable quantities of the compounds or pharmaceutically acceptable derivatives thereof. Pharmaceutical compositions are also provided for administration to humans and animals in unit dosage form, such as tablets, capsules, pills, powders, granules, and oral or nasal solutions or suspensions, and oil-water emulsions containing suitable quantities of an antibody or antigen-binding fragment thereof described herein or pharmaceutically acceptable derivatives thereof. The antibody or antigen-binding fragment thereof described herein is, in one embodiment, formulated and administered in unit-dosage forms or multiple-dosage forms. Unit-dose forms as used herein refers to physically discrete units suitable for human or animal (*e.g.*, mammal) subjects and packaged individually. Each unit-dose contains a predetermined quantity of an antibody or antigen-binding fragment thereof described herein sufficient to produce the desired therapeutic effect, in association with the required pharmaceutical carrier, vehicle or diluent. Examples of unit-dose forms include ampoules and syringes and individually packaged tablets or capsules. Unit-dose forms can be administered in fractions or multiples thereof. A multiple-dose form is a plurality of identical unit-dosage forms packaged in a single container to be administered in segregated unit-dose form. Examples of multiple-dose forms include vials, bottles of tablets or capsules or bottles. Hence,

in specific aspects, multiple dose form is a multiple of unit-doses which are not segregated in packaging.

[00278] In certain embodiments, one or more antibodies described herein or antigen-binding fragments thereof are in a liquid pharmaceutical formulation. Liquid pharmaceutically administrable compositions can, for example, be prepared by dissolving, dispersing, or otherwise mixing an antibody and optional pharmaceutical adjuvants in a carrier, such as, for example, water, saline, aqueous dextrose, glycerol, glycols, and the like, to thereby form a solution or suspension. In certain embodiments, a pharmaceutical composition provided herein to be administered can also contain minor amounts of nontoxic auxiliary substances such as wetting agents, emulsifying agents, solubilizing agents, and pH buffering agents and the like.

[00279] Actual methods of preparing such dosage forms are known, or will be apparent, to those skilled in this art; for example, *see, e.g., Remington's Pharmaceutical Sciences* (1990) Mack Publishing Co., Easton, PA; Remington: The Science and Practice of Pharmacy, 21st ed. (2006) Lippincott Williams & Wilkins, Baltimore, MD.

[00280] Parenteral administration, in one embodiment, is characterized by injection, either subcutaneously, intramuscularly or intravenously is also contemplated herein. Injectables can be prepared in conventional forms, either as liquid solutions or suspensions, solid forms suitable for solution or suspension in liquid prior to injection, or as emulsions. The injectables, solutions and emulsions also contain one or more excipients. Suitable excipients are, for example, water, saline, dextrose, glycerol or ethanol. Other routes of administration may include, enteric administration, intracerebral administration, nasal administration, intraarterial administration, intracardiac administration, intraosseous infusion, intrathecal administration, and intraperitoneal administration.

[00281] Preparations for parenteral administration include sterile solutions ready for injection, sterile dry soluble products, such as lyophilized powders, ready to be combined with a solvent just prior to use, including hypodermic tablets, sterile suspensions ready for injection, sterile dry insoluble products ready to be combined with a vehicle just prior to use and sterile emulsions. The solutions can be either aqueous or nonaqueous.

[00282] If administered intravenously, suitable carriers include physiological saline or phosphate buffered saline (PBS), and solutions containing thickening and solubilizing agents, such as sucrose, glucose, polyethylene glycol, and polypropylene glycol and mixtures thereof.

[00283] Pharmaceutically acceptable carriers used in parenteral preparations include aqueous vehicles, nonaqueous vehicles, antimicrobial agents, isotonic agents, buffers, antioxidants, local anesthetics, suspending and dispersing agents, emulsifying agents, sequestering or chelating agents and other pharmaceutically acceptable substances.

[00284] Pharmaceutical carriers also include ethyl alcohol, polyethylene glycol and propylene glycol for water miscible vehicles; and sodium hydroxide, hydrochloric acid, citric acid or lactic acid for pH adjustment.

[00285] In certain embodiments, intravenous or intraarterial infusion of a sterile aqueous solution containing an antibody or antigen-binding fragment thereof described herein is an effective mode of administration. Another embodiment is a sterile aqueous or oily solution or suspension containing an antibody or antigen-binding fragment thereof described herein injected as necessary to produce the desired pharmacological effect.

[00286] In specific embodiments, an antibody or antigen-binding fragment thereof described herein can be suspended in micronized or other suitable form. The form of the resulting mixture depends upon a number of factors, including the intended mode of administration and the solubility of the compound in the selected carrier or vehicle.

[00287] In other embodiments, the pharmaceutical formulations are lyophilized powders, which can be reconstituted for administration as solutions, emulsions and other mixtures. They can also be reconstituted and formulated as solids or gels.

[00288] Lyophilized powder can, for example, be prepared by dissolving an antibody or antigen-binding fragment thereof provided herein, in a suitable solvent. In some embodiments, the lyophilized powder is sterile. Suitable solvents can contain an excipient which improves the stability or other pharmacological component of the powder or reconstituted solution, prepared from the powder. Excipients that can be used include, but are not limited to, dextrose, sorbitol, fructose, corn syrup, xylitol, glycerin, glucose, sucrose or other suitable agent. A suitable solvent can also contain a buffer, such as citrate, sodium or potassium phosphate or other such

buffer known to those of skill in the art at, in one embodiment, about neutral pH. Subsequent sterile filtration of the solution followed by lyophilization under standard conditions known to those of skill in the art provides an example of a formulation. In one embodiment, the resulting solution will be apportioned into vials for lyophilization. Lyophilized powder can be stored under appropriate conditions, such as at about 4 °C to room temperature.

[00289] Reconstitution of this lyophilized powder with water for injection provides a formulation for use in parenteral administration. For reconstitution, the lyophilized powder is added to sterile water or other suitable carrier.

[00290] In certain aspects, antibodies or antigen-binding fragments thereof provided herein can be formulated for local administration or topical application, such as for topical application to the skin and mucous membranes, such as in the eye, in the form of gels, creams, and lotions and for application to the eye or for intracisternal or intraspinal application. Topical administration is contemplated for transdermal delivery and also for administration to the eyes or mucosa, or for inhalation therapies. Nasal solutions of the active compound alone or in combination with other pharmaceutically acceptable excipients can also be administered.

[00291] Antibodies or antigen-binding fragments thereof and other compositions provided herein can also be formulated to be targeted to a particular tissue, organ, or other area of the body of the subject to be treated. Many such targeting methods are well known to those of skill in the art. All such targeting methods are contemplated herein for use in the instant compositions. For non-limiting examples of targeting methods, see, *e.g.*, U.S. Patent Nos. 6,316,652, 6,274,552, 6,271,359, 6,253,872, 6,139,865, 6,131,570, 6,120,751, 6,071,495, 6,060,082, 6,048,736, 6,039,975, 6,004,534, 5,985,307, 5,972,366, 5,900,252, 5,840,674, 5,759,542 and 5,709,874. In some embodiments, antibodies described herein are targeted (or otherwise administered) to the visual organs, bone marrow, gastrointestinal tract, lungs, brain, or joints. In specific embodiments, an antibody described herein is capable of crossing the blood-brain barrier.

[00292] Provided herein is a pharmaceutical pack or kit comprising one or more containers filled with one or more of the ingredients of the pharmaceutical compositions described herein, such as one or more antibodies or antigen-binding fragments thereof provided herein. Optionally associated with such container(s) can be a notice in the form prescribed by a governmental

agency regulating the manufacture, use or sale of pharmaceuticals or biological products, which notice reflects approval by the agency of manufacture, use or sale for human administration.

[00293] Also provided herein are kits comprising one or more of the antibodies or antigen-binding fragments thereof described herein. In one embodiment, a kit comprises an antibody or or antigen-binding fragment thereof described herein, in one or more containers. In a specific embodiment, kits described herein contain a substantially purified antigen as a control. In another specific embodiment, the kits described herein further comprise a control antibody which does not react with an antigen. In another specific embodiment, kits described herein contain one or more elements for detecting the binding of a modified antibody to an antigen (*e.g.*, the antibody can be conjugated to a detectable substrate such as a fluorescent compound, an enzymatic substrate, a radioactive compound or a luminescent compound, or a second antibody which recognizes the first antibody can be conjugated to a detectable substrate). In specific embodiments, a kit provided herein can include a recombinantly produced or chemically synthesized antigen. The antigen provided in the kit can also be attached to a solid support. In a more specific embodiment, the detecting means of the above described kit includes a solid support to which an antigen is attached. Such a kit can also include a non-attached reporter-labeled anti-human antibody or anti-mouse/rat antibody. In this embodiment, binding of the antibody to the antigen can be detected by binding of the said reporter-labeled antibody.

5.4 Uses and Methods

[00294] In particular aspects, provided herein are methods of modulating an antigen (*e.g.*, CD47) activity with an antibody (*e.g.*, anti-CD47 antibody) or an antigen-binding fragment thereof described herein that specifically binds to the antigen.

[00295] In specific embodiments, provided herein are methods of inhibiting (*e.g.*, partially inhibiting) an antigen (*e.g.*, CD47) activity with an antibody (*e.g.*, anti-CD47 antibody) or an antigen-binding fragment thereof described herein that specifically binds to and antagonizes the antigen (*e.g.*, CD47) activity. In specific embodiments, provided herein are methods of activating an antigen activity with an antibody or an antigen-binding fragment thereof described herein that specifically binds to and agonizes the antigen activity.

[00296] In certain embodiments, provided herein are methods of managing or treating a condition or disorder, such as cancer, autoimmune disorder, immunological disorder or

infectious disease, using an antibody (*e.g.*, anti-CD47 antibody) or an antigen-binding fragment thereof described herein. In certain embodiments, provided herein are methods of protecting against a condition or disorder, such as cancer, autoimmune disorder, immunological disorder or infectious disease, using an antibody (*e.g.*, anti-CD47 antibody) or an antigen-binding fragment thereof described herein. In certain embodiments, provided herein is a method of alleviating, inhibiting or reducing the progression or severity of one or more symptoms associated with the condition or disorder, such as cancer, autoimmune disorder, immunological disorder or infectious disease, using an antibody (*e.g.*, anti-CD47 antibody) or an antigen-binding fragment thereof described herein.

[00297] In a specific embodiment, provided herein is a method of treating a condition or disorder, such as cancer, autoimmune disorder, immunological disorder or infectious disease, in a subject comprising administering (*e.g.*, administering concurrently or sequentially) to a subject in need thereof (i) an antibody (*e.g.*, anti-CD47 antibody) or an antigen-binding fragment thereof described herein, and (ii) another agent for treating the condition or disorder.

[00298] In a specific embodiment, provided herein is a method of treating a condition or disorder, such as cancer, autoimmune disorder, immunological disorder or infectious disease, in a subject in need thereof, the method comprising administering to the subject an antibody or antigen-binding fragment thereof described herein or the pharmaceutical composition described herein.

[00299] In a specific embodiment, provided herein is a method of alleviating a symptom of a condition or disorder, such as cancer, autoimmune disorder, immunological disorder or infectious disease, in a subject in need thereof, the method comprising administering to the subject an antibody or antigen-binding fragment thereof described herein or the pharmaceutical composition described herein.

[00300] In various embodiments of the methods described in this Section, the subject being treated or managed with an antibody or an antigen-binding fragment thereof described herein experiences no, minimal or negligible side effects caused by the antibody or antigen-binding fragment thereof during and/or after the treatment or management.

[00301] As used herein, “administer” or “administration” refers to the act of injecting or otherwise physically delivering a substance (*e.g.*, a humanized antibody provided herein or an

antigen-binding fragment thereof) to a subject or a patient (*e.g.*, human), such as by mucosal, topical, intradermal, parenteral, intravenous, subcutaneous, intramuscular delivery and/or any other method of physical delivery described herein or known in the art.

[00302] As used herein, the terms “effective amount” or “therapeutically effective amount” refer to an amount of a therapy (*e.g.*, an antibody or antigen-binding fragment thereof or pharmaceutical composition provided herein) which is sufficient to reduce and/or ameliorate the severity and/or duration of a given condition, disorder or disease (*e.g.*, cancer, metastasis, or angiogenesis) and/or a symptom related thereto. These terms also encompass an amount necessary for the reduction, slowing, or amelioration of the advancement or progression of a given disease, reduction, slowing, or amelioration of the recurrence, development or onset of a given disease, and/or to improve or enhance the prophylactic or therapeutic effect(s) of another therapy (*e.g.*, a therapy other than an antibody or antigen-binding fragment thereof provided herein). In some embodiments, “effective amount” as used herein also refers to the amount of an antibody described herein to achieve a specified result.

[00303] As used herein, the term “in combination” in the context of the administration of other therapies refers to the use of more than one therapy. The use of the term “in combination” does not restrict the order in which therapies are administered. The therapies may be administered, *e.g.*, serially, sequentially, concurrently, or concomitantly.

[00304] As used herein, the terms “manage,” “managing,” and “management” refer to the beneficial effects that a subject derives from a therapy (*e.g.*, a prophylactic or therapeutic agent), which does not result in a cure of a condition or disorder. In certain embodiments, a subject is administered one or more therapies (*e.g.*, prophylactic or therapeutic agents, such as an antibody or antigen-binding fragment thereof described herein) to “manage” a condition or disorder described herein, one or more symptoms thereof, so as to prevent the progression or worsening of the condition or disorder.

[00305] As used herein, the terms “impede” or “impeding” in the context of a condition or disorder provided herein (*e.g.*, autoimmune disorder, immunological disorder, cancer, infectious disease, or inflammation) refer to the total or partial inhibition (*e.g.*, less than 100%, 95%, 90%, 80%, 70%, 60%, 50%, 40%, 30%, 20%, 10%, or 5%) or blockage of the development, recurrence, onset or spread of a condition or disorder provided herein (*e.g.*, cancer, metastasis, or

angiogenesis) and/or symptom related thereto, resulting from the administration of a therapy or combination of therapies provided herein (*e.g.*, a combination of prophylactic or therapeutic agents, such as an antibody or antigen-binding fragment thereof described herein).

[00306] As used herein, the terms “subject” and “patient” are used interchangeably. As used herein, a subject is a mammal such as a non-primate (*e.g.*, cows, pigs, horses, cats, dogs, goats, rabbits, rats, mice, *etc.*) or a primate (*e.g.*, monkey and human), for example a human. In one embodiment, the subject is a mammal, *e.g.*, a human, diagnosed with a condition or disorder provided herein (*e.g.*, cancer, metastasis, or angiogenesis). In another embodiment, the subject is a mammal, *e.g.*, a human, at risk of developing a condition or disorder provided herein (*e.g.*, cancer, metastasis, or angiogenesis). In a preferred embodiment, the subject is a human.

[00307] As used herein, the term “side effects” encompasses unwanted and adverse effects of a therapy, and can be caused by immunogenicity of a therapeutic antibody. Unwanted effects are not necessarily adverse. An adverse effect from a therapy can be harmful or uncomfortable or risky. Examples of side effects can include, diarrhea, cough, gastroenteritis, wheezing, nausea, vomiting, anorexia, abdominal cramping, fever, pain, loss of body weight, dehydration, alopecia, dyspnea, insomnia, dizziness, mucositis, nerve and muscle effects, fatigue, dry mouth, and loss of appetite, rashes or swellings at the site of administration, flu-like symptoms such as fever, chills and fatigue, digestive tract problems and allergic reactions. Additional undesired effects experienced by patients are numerous and known in the art. Many are described in the Physician’s Desk Reference (63rd ed., 2009).

[00308] In certain embodiments, the antigen to which the antibody or antigen-binding fragment thereof described herein specifically binds (*e.g.*, CD47) is amplified in cells of a subject, *e.g.*, the human subject. Identification of antigen amplification in a sample from a subject can be performed by assays known to one of ordinary skill in the art, such as, *e.g.*, quantitative reverse transcription PCR, immunoblot assays, DNA fingerprinting, karyotyping (for example, by multicolor fluorescence in situ hybridization (mFISH)), comparative genome hybridization, and gene expression profiling. As a non-limiting example, protein expression of tumor samples can be characterized using immunohistochemical assays to measure the amount of the antigen protein present in a sample.

[00309] In certain embodiments, the antigen to which the antibody or antigen-binding fragment thereof described herein specifically binds is mutated in cells of a subject, *e.g.*, the human subject. Identification of mutations in a sample from a subject can be performed by assays known to one of ordinary skill in the art, such as, *e.g.*, DNA extraction, generation of complementary DNA, and cDNA sequencing. The cDNA sequence, for example, can be utilized to obtain the translation product by methods known to one of ordinary skill in the art. Genetic mutations and amino acid substitutions can be identified by, for example, comparing the sequence from the sample from the subject to a wild type and/or consensus sequence.

[00310] As used herein, the terms “therapies” and “therapy” can refer to any protocol(s), method(s), compositions, formulations, and/or agent(s) that can be used in the prevention, treatment, management, or amelioration of a condition or disorder or symptom thereof (*e.g.*, a condition or disorder provided herein (*e.g.*, cancer) or one or more symptoms or condition associated therewith). In certain embodiments, the terms “therapies” and “therapy” refer to drug therapy, adjuvant therapy, radiation, surgery, biological therapy, supportive therapy, and/or other therapies useful in treatment, management, prevention, or amelioration of a condition or disorder or one or more symptoms thereof (*e.g.*, cancer or one or more symptoms or condition associated therewith). In certain embodiments, the term “therapy” refers to a therapy other than an antibody described herein or pharmaceutical composition thereof. In specific embodiments, an “additional therapy” and “additional therapies” refer to a therapy other than a treatment using an antibody or antigen-binding fragment thereof described herein or pharmaceutical composition thereof. In a specific embodiment, a therapy includes the use of an antibody or antigen-binding fragment thereof described herein as an adjuvant therapy. For example, using an antibody or antigen-binding fragment thereof described herein in conjunction with a drug therapy, biological therapy, surgery, and/or supportive therapy.

[00311] Non-limiting examples of a condition which can be treated or managed with an antibody (*e.g.*, anti-CD47 antibody) or an antigen-binding fragment thereof described herein include hematological cancer and/or solid tumors, autoimmune disorders, immunological disorders and infectious diseases.

[00312] In particular embodiments, provided herein are methods for managing, treating, preventing or protecting against cancer, comprising administering to a subject in need thereof a

therapeutically effective amount of an antibody (*e.g.*, anti-CD47 antibody) or an antigen-binding fragment described herein. In certain embodiments, provided herein is a method of alleviating, inhibiting or reducing the progression or severity of one or more symptoms associated with cancer, comprising administering to a subject in need thereof a therapeutically effective amount of an antibody (*e.g.*, anti-CD47 antibody) or an antigen-binding fragment described herein. Then cancer can be a hematological cancer or a solid cancer (*i.e.*, solid tumor).

[00313] As used herein, “hematological cancer” refers to a cancer of the blood, and includes leukemia, lymphoma and myeloma among others. “Leukemia” refers to a cancer of the blood in which too many white blood cells that are ineffective in fighting infection are made, thus crowding out the other parts that make up the blood, such as platelets and red blood cells. It is understood that cases of leukemia are classified as acute or chronic. Certain forms of leukemia include, by way of non-limiting example, acute lymphocytic leukemia (ALL); acute myeloid leukemia (AML); chronic lymphocytic leukemia (CLL); chronic myelogenous leukemia (CML); Myeloproliferative disorder/neoplasm (MPDS); and myelodysplasia syndrome. “Lymphoma” may refer to a Hodgkin’s lymphoma, both indolent and aggressive non-Hodgkin’s lymphoma, Burkitt’s lymphoma, and follicular lymphoma (small cell and large cell), among others. Myeloma may refer to multiple myeloma (MM), giant cell myeloma, heavy-chain myeloma, and light chain or Bence-Jones myeloma. In a specific embodiment, the hematological cancer is multiple myeloma, non-Hodgkin’s lymphoma, acute myeloid leukemia (AML), breast cancer, bladder cancer, non-small cell lung cancer/carcinoma, hepatocellular carcinoma (HCC), sarcoma, or head and neck cancer.

[00314] Solid tumors include, but are not limited to, *e.g.*, breast tumors, ovarian tumors, lung tumors, pancreatic tumors, prostate tumors, melanoma tumors, colorectal tumors, lung tumors, head and neck tumors, bladder tumors, esophageal tumors, liver tumors, and kidney tumors.

[00315] Symptoms associated with cancers and other neoplastic disorders include, for example, inflammation, fever, general malaise, fever, pain, often localized to the inflamed area, loss of appetite, weight loss, edema, headache, fatigue, rash, anemia, muscle weakness, muscle fatigue and abdominal symptoms such as, for example, abdominal pain, diarrhea or constipation.

[00316] In specific aspects, provided herein is an antibody (*e.g.*, anti-CD47 antibody) or an antigen-binding fragment thereof useful in treating, delaying the progression of, impeding,

preventing relapse of or alleviating a symptom of a cancer (*e.g.*, MM, NHL, AML, breast cancer, bladder cancer, non-small cell lung cancer/carcinoma, hepatocellular carcinoma (HCC), sarcoma, and head and neck cancer). For example, in certain embodiments, an antibody (*e.g.*, anti-CD47 antibody) or an antigen-binding fragment thereof described herein is useful in treating hematological malignancies and/or tumors, *e.g.*, hematological malignancies and/or tumors. For example, the anti-CD47 antibodies or antigen-binding fragments thereof described herein are useful in treating CD47+ tumors. By way of non-limiting example, an antibody (*e.g.*, anti-CD47 antibody) or an antigen-binding fragment thereof described herein is useful in treating non-Hodgkin's lymphoma (NHL), acute lymphocytic leukemia (ALL), acute myeloid leukemia (AML), chronic lymphocytic leukemia (CLL), chronic myelogenous leukemia (CML), multiple myeloma (MM), breast cancer, ovarian cancer, head and neck cancer, bladder cancer, melanoma, colorectal cancer, pancreatic cancer, lung cancer, leiomyoma, leiomyosarcoma, glioma, glioblastoma, breast tumors, ovarian tumors, lung tumors (*e.g.*, NSCLC), pancreatic tumors, prostate tumors, melanoma tumors, colorectal tumors, lung tumors, head and neck tumors, bladder tumors, esophageal tumors, liver tumors (*e.g.*, hepatocellular carcinoma), sarcoma, and/or kidney tumors.

[00317] In a specific embodiment, provided herein is a method of treating cancer in a subject in need thereof, the method comprising administering to the subject an antibody or antigen-binding fragment described herein or the pharmaceutical composition described herein. In a further specific embodiment, the method further comprises administering to the subject radiotherapy or chemotherapy. In another further specific embodiment, the method further comprises administering to the subject another anti-cancer agent.

[00318] In a specific embodiment, provided herein is a method of alleviating a symptom of a cancer in a subject in need thereof, the method comprising administering to the subject an antibody or antigen-binding fragment described herein or the pharmaceutical composition described herein. In a further specific embodiment, the method further comprises administering to the subject radiotherapy or chemotherapy. In another further specific embodiment, the method further comprises administering to the subject another anti-cancer agent.

[00319] In a specific embodiment, provided herein is a method of treating cancer (*e.g.*, a hematological disorder/cancer or solid cancer) in a subject comprising administering (*e.g.*,

administering concurrently or sequentially) to a subject in need thereof (i) an antibody (*e.g.*, anti-CD47 antibody) or an antigen-binding fragment thereof described herein, and (ii) another anti-cancer agent. In certain embodiments, the second anti-cancer agent is a chemotherapeutic agent (*e.g.*, microtubule disassembly blocker, antimetabolite, topoisomerase inhibitor, and DNA crosslinker or damaging agent). In certain embodiments, the second anti-cancer agent is a tyrosine kinase inhibitor (*e.g.*, GLEEVEC[®] (imatinib mesylate) or SUTENT[®] (SU11248 or Sunitinib)). Other non-limiting examples of tyrosine kinase inhibitors include 706 and AMNI07 (nilotinib), RAD001, PKC412, gefitinib (IRESSA[™]), erlotinib (TARCEVA[®]), sorafenib (NEXAVAR[®]), pazopanib (VOTRIENT[™]), axitinib, bosutinib, cediranib (RECENTIN[®]), SPRYCEL[®] (dasatinib), lapatinib (TYKERB[®]), lestaurtinib, neratinib, nilotinib (TASIGNA[®]), semaxanib, toceranib (PALLADIA[™]), vandetanib (ZACTIMA[™]), and vatalanib.

[00320] In a specific aspect, provided herein is a method of treating cancer (*e.g.*, a hematological disorder/cancer or solid cancer) in a subject comprising administering (*e.g.*, administering concurrently or sequentially) to a subject in need thereof (i) an antibody (*e.g.*, anti-CD47 antibody) or an antigen-binding fragment thereof described herein, and (ii) a radiotherapy.

[00321] In a particular aspect, provided herein is a method of promoting (*e.g.*, inducing or increasing) phagocytosis, *e.g.*, macrophage mediated phagocytic killing of tumor cells, comprising contacting an effective amount of an antibody (*e.g.*, anti-CD47 antibody) or an antigen-binding fragment thereof described herein with tumor cells. Also provided herein is a method of promoting (*e.g.*, inducing or increasing) phagocytosis, *e.g.*, macrophage mediated phagocytic killing of tumor cells, in a subject in need thereof (*e.g.*, a subject with tumor cells), comprising administering to the subject an effective amount of an antibody (*e.g.*, anti-CD47 antibody) or an antigen-binding fragment thereof described herein.

[00322] In a particular aspect, provided herein is a method of reducing tumor volume, comprising contacting an effective amount of an antibody (*e.g.*, anti-CD47 antibody) or an antigen-binding fragment thereof described herein. Also provided herein is a method of reducing tumor volume in a subject in need thereof (*e.g.*, a subject with a tumor), comprising administering to the subject an effective amount of an antibody (*e.g.*, anti-CD47 antibody) or an antigen-binding fragment thereof described herein.

[00323] In a particular aspect, provided herein is a method of inhibiting cancer cell growth or proliferation, comprising contacting an effective amount of an antibody (*e.g.*, anti-CD47 antibody) or an antigen-binding fragment thereof described herein with cancer cells. Also provided herein is a method of inhibiting cancer cell growth or proliferation in a subject in need thereof (*e.g.*, a subject with cancer cells), comprising administering to the subject an effective amount of an antibody (*e.g.*, anti-CD47 antibody) or an antigen-binding fragment thereof described herein.

5.4.1 Diagnostic Uses

[00324] In one aspect, an antibody (*e.g.*, anti-CD47 antibody) or an antigen-binding fragment thereof described herein can be used for diagnostic purposes to detect, diagnose, or monitor a condition or disorder described herein (*e.g.*, a condition or disorder associated with the antigen, abnormal expression of the antigen, and/or abnormal signaling involving the antigen), such as cancer (*e.g.*, a hematological cancer or solid cancer), autoimmune disorder, immunological disorder or infectious disease. In specific embodiments, an antibody (*e.g.*, anti-CD47 antibody) or an antigen-binding fragment thereof described herein for use in diagnostic purposes is labeled.

[00325] Presence of the labeled molecule can be detected in the subject using methods known in the art for *in vivo* scanning. Skilled artisans will be able to determine the appropriate method for detecting a particular label. Methods and devices that may be used in the diagnostic methods of the invention include, but are not limited to, computed tomography (CT), whole body scan such as position emission tomography (PET), magnetic resonance imaging (MRI), and sonography.

[00326] Methods provided herein for diagnostic purposes to detect, diagnose, or monitor a condition described herein can be *in vitro* methods, *in situ* methods, or *ex vivo* methods. Methods provided herein for diagnostic purposes to detect, diagnose, or monitor a condition described herein can be *in vivo* methods.

[00327] In certain embodiments, provided herein are methods for the detection of a condition described herein, such as cancer (*e.g.*, a hematological cancer or solid cancer), autoimmune disorder, immunological disorder or infectious disease, comprising: (a) assaying the expression of an antigen (*e.g.*, CD47) in a sample of a subject using an antibody (*e.g.*, anti-CD47 antibody) or an antigen-binding fragment thereof described herein that specifically binds to the antigen

(*e.g.*, CD47); and (b) comparing the expression level of the antigen (*e.g.*, CD47) with a control expression level, *e.g.*, levels in normal tissue samples (*e.g.*, from a patient not having a condition described herein, or from the same patient before onset of the condition), whereby an increase or decrease in the assayed expression level of the antigen (*e.g.*, CD47) compared to the control expression level of the antigen (*e.g.*, CD47) is indicative of a condition described herein.

[00328] In certain embodiments, provided herein are methods for the detection of cancer expressing an antigen (*e.g.*, CD47), such as overexpressing the antigen, comprising: (a) assaying the expression of the antigen (*e.g.*, CD47) in a sample of a subject using an antibody (*e.g.*, anti-CD47 antibody) or an antigen-binding fragment thereof that specifically binds to the antigen (*e.g.*, CD47); and (b) comparing the expression level of the antigen (*e.g.*, CD47) with a control expression level, *e.g.*, levels in normal samples (*e.g.*, from a patient not having cancer, a patient having cancer that does not overexpress the antigen (*e.g.*, CD47), or from the same patient before onset of cancer). In specific aspects, an increase or decrease in the assayed expression level of the antigen (*e.g.*, CD47) compared to a control expression level of the antigen (*e.g.*, CD47) is indicative of cancer expressing the antigen (*e.g.*, CD47).

[00329] In a specific embodiment, provided herein is a method of diagnosing a cancer expressing an antigen (*e.g.*, CD47) in a patient, wherein the method comprises the steps of:

- (a) contacting a biological sample from the patient with an antibody (*e.g.*, anti-CD47 antibody) or an antigen-binding fragment thereof that specifically binds to the antigen (*e.g.*, CD47);
- (b) detecting binding of the antibody or antigen-binding fragment to the antigen to determine a protein level of the antigen (*e.g.*, CD47) in the biological sample from the patient; and
- (c) comparing the protein level of the antigen (*e.g.*, CD47) with a standard protein level of the antigen (*e.g.*, CD47).

[00330] In a specific embodiment, provided herein is a method of monitoring protein level of an antigen (*e.g.*, CD47) during treatment of a cancer expressing the antigen (*e.g.*, CD47) in a patient, wherein the method comprises the steps of:

- (a) contacting a biological sample from the patient with an antibody (*e.g.*, anti-CD47 antibody) or an antigen-binding fragment thereof that specifically binds to the antigen (*e.g.*, CD47);

(b) detecting binding of the antibody or antigen-binding fragment to the antigen (*e.g.*, CD47) to determine a protein level of the antigen (*e.g.*, CD47) in the biological sample from the patient; and

(c) comparing the protein level of the antigen (*e.g.*, CD47) with a standard protein level of the antigen (*e.g.*, CD47).

[00331] Any sample (*e.g.*, bodily fluid or tissue sample) from a subject can be used in diagnostic methods provided herein. Non-limiting examples of samples which can be used in diagnostic methods provided herein include, serum sample, plasma sample, tissue sample, urine sample, tumor sample, and stool sample.

[00332] Antibodies described herein can be used to assay levels of the antigen (*e.g.*, CD47) in a biological sample using classical immunohistological methods as described herein or as known to those of skill in the art (*e.g.*, see Jalkanen *et al.*, 1985, J. Cell. Biol. 101:976-985; and Jalkanen *et al.*, 1987, J. Cell. Biol. 105:3087-3096). Other antibody-based methods useful for detecting protein gene expression include immunoassays, such as the enzyme linked immunosorbent assay (ELISA) and the radioimmunoassay (RIA). Suitable antibody assay labels are known in the art and include enzyme labels, such as, glucose oxidase; radioisotopes, such as iodine (125I, 121I), carbon (14C), sulfur (35S), tritium (3H), indium (121In), and technetium (99Tc); luminescent labels, such as luminol; and fluorescent labels, such as fluorescein and rhodamine, and biotin.

[00333] In one embodiment, monitoring of a condition or disorder described herein (*e.g.*, a condition or disorder associated with the antigen, abnormal expression of the antigen, and/or abnormal signaling involving the antigen), such as cancer (*e.g.*, a hematological cancer or solid cancer), autoimmune disorder, immunological disorder or infectious disease, is carried out by repeating the method for diagnosing for a period of time after initial diagnosis.

6. EXAMPLES

[00334] The examples in this section (*i.e.*, Section 6) are offered by way of illustration, and not by way of limitation.

6.1 Example 1: Antibody Design

[00335] Antibodies were designed by engineering variants into a parental anti-CD47 antibody described in International Application Publication No. WO 2013/119714 A1 (*i.e.*

Ab_{parental}). Amino acid substitutions were introduced into the frameworks of the light chain and the heavy chain and the CDRs of the light chain.

[00336] The *in silico* immunogenicity analysis tool, Interactive Screening and Protein Reengineering Interface (ISPRI: EpiVax, RI), was applied to obtain EpiMatrix Z-scores. According to EpiVax, the Z-score indicates the potential of a 9-mer peptide to bind to a given HLA allele. All Z-scores in the top 5%, which is a Z-score equal or greater than 1.64, are considered “Hits”. Peptides containing four or more alleles scoring above 1.64 are referred to as “effector T cell (Teff) epitopes.” Peptides conserved in IgG antibodies and believed to be either passively tolerated or actively regulatory are referred to as “regulatory T cell (Treg) epitopes.” Normalized EpiMatrix Z scores adjusted for Treg epitopes along with categorized immunogenicity were taken into account to evaluate potential immunogenicity.

[00337] Several framework residues in the parental light and heavy chains that contained high ratios of Teff epitopes or low ratios of Treg epitopes were identified. The light and heavy chain framework residues were aligned with clinically safe antibodies that represent low clinical immunogenicity. Frequently used amino acids from framework regions of the safe antibodies were utilized to site-specifically replace the residues that represent potentially high immunogenicity. The categorized immunogenic potential for the resulting variants was decreased from 7.5% for the parental antibody (EpiMatrix Epx score of approximately -9.95) to 0.5% or less, which is on par with the clinically safe antibodies that contain relatively low ratios of Teff epitopes and high ratios of Treg epitopes. Results of the immunogenicity analysis for certain of the variants are shown in Table 5 and Table 6. A number of the variants were constructed and tested. Several variants demonstrated increased expression, retained affinity, retained *in vitro* phagocytosis function, no hemagglutination, increased stability and increased solubility, as discussed in detail, below.

[00338] The analysis also identified a very high ratio of Teff epitopes in the CDR L2 region of the parental CD47 antibody. Several residues in the CDR L2 interact with CD47. In order to reduce potential immunogenicity by abrogating Teff epitopes while retaining CD47 binding affinity, *in silico* computational engineering was applied. Briefly, a crystal structure of CD47 co-complexed with 2A1 antibody, which is the original mouse version of the parental antibody described in International Application Publication No. WO 2013/119714 A1, was computationally optimized by filling the structural gaps, adding up hydrogens and energy

minimization. A computational protein engineering software, Molecular Operating Environment (MOE; Chemical Computing Group, Montreal, Quebec, Canada) was utilized. Affinity and stability calculation functions in MOE were applied to identify CDR L2 mutants with retained or increased affinity and stability. The engineered CDR L2 sequences that retained or increased affinity and stability were analyzed by EpiVax analysis in order to identify the CDR L2 sequences that decreased the categorized immunogenic potential to 0%. The parental CDR L2 sequence was replaced with the computationally optimized CDR L2 sequences. A number of the variants comprising optimized CDR L2 sequences and framework variants as described above were then constructed and tested. Several of these variants demonstrated increased expression, retained affinity, retained *in vitro* phagocytosis function, no hemagglutination, and increased stability and increased solubility. Results of the immunogenicity analysis for certain of the variants are shown in Table 5 and Table 6. The results show that the variants have lower immunogenicity potential than the parental antibody in humans.

[00339] Table 5. Results of the immunogenicity analysis (FR variants).

Immunogenicity Prediction	
Construct: LC/HC	EpiVax Score
Ab495/Ab480	-38.59
Ab495/Ab356	-37.54
Ab1119/Ab480	-33.11
Ab1119/Ab356	-32.06
Ab1119/Ab356	-32.06
Ab1119/Ab387	-30.74
Ab1119/Ab387	-30.74
Ab1119/Ab170	-29.61
Ab482/Ab387	-26.35
Parental LC-HC	-9.95

[00340] Table 6. Results of the immunogenicity analysis (FR and CDR L2 variants).

Immunogenicity Prediction	
Construct: LC/HC	EpiVax Score
Ab356/Ab1120	-53.64
Ab480/Ab1120	-54.68
Ab356/Ab1121	-52.56
Ab480/Ab1121	-53.61
Ab356/Ab1122	-54.77
Ab480/Ab1122	-55.81

Ab356/Ab1127	-53.55
Ab480/Ab1127	-54.6
Ab356/Ab1129	-38.84
Ab1119/Ab480	-33.11
Ab1119/Ab356	-32.06
Parental LC-HC	-9.95

6.2 Example 2: Antibody Production

[00341] Materials and Methods:

[00342] Antibody chains were synthesized by DNA2.0 and subcloned into the pTT5 vector. The antibodies were transiently transfected in all combinations using Expi293 or ExpiCHO-S cells in 24 deep well plates (24-DWP, Axygen, #14222350) according to Thermo Fisher/Life Technologies protocols. For each antibody, a DNA ratio of 3:2 or 1:1 LC:HC was used for expression at 1 µg/mL DNA/expression media, and cultures were shaken at 500 RPM (293) or 350 RPM (CHO) using a 3mM swing shaking platform. Typically, cultures were incubated at 37°C, but for the purposes of expression optimization, some cultures were incubated at 32°C (ExpiCHO-S only). Antibody titers for all expressions were assessed using biolayer interferometry (ForteBio Octet), with anti-Fc or Protein A Biosensors. Certain variant antibodies have substantially higher expression levels than the parental antibody (Table 7 and Table 8). As an initial assessment, antibodies were tested by flow cytometry for binding to the CD47-positive cell line CCRF-CEM. Briefly, for each antibody, 0.5×10^6 cells were isolated and stained with 10µg/mL of antibody in cell supernatant as determined by Octet (Figure 1). Cells were then stained with 0.1mL PBS containing 1:100 dilution of Alex fluor 488 anti-human F(ab')₂, H+L (Jackson IRR). All cell surface staining was done at 4°C for 30 minutes and followed with 2x washes with PBS with a final resuspension in PBS prior to running cells on an Attune flow cytometer (Thermo Fisher). In a subsequent flow cytometry experiment using purified mAbs from the same 24-DWP expression, binding of mAbs to CD47 on CCRF-CEM cells was evaluated using a subsaturating concentration of 0.5µg/mL. These results were compared with *in silico* immunogenicity and affinity K_D's (Figures 2 and 3), and certain antibodies were chosen for additional rounds of expression.

[00343] Purifications of samples in 24-DWP were conducted using a Hamilton automated liquid handler using and Protein A affinity capture using Phynexus tips. After elution from the

tips with NaOAc, pH 3.0, antibodies were resolved using Preparative SEC (ÄKTA), and formulated in 10mM NaOAc, pH 5.5, 9% sucrose. Sample quality was confirmed using analytical SEC (Agilent), LC/MS, SDS-PAGE, and Biacore.

[00344] Additional rounds of larger protein expressions were conducted for certain antibodies. Larger scale productions ranged between 150mL to 25L in Expi293 or ExpiCHO cells (Thermo Fisher). Protocols were followed according to Thermo Fisher Scientific instructions, but typically 2×10^6 to 1×10^7 cells/mL were seeded and LC and HC were transiently transfected at a 1:1 or 3:2 ratio ranging from .5-1 μ g/mL. For scales from 150mL to 3L, Corning unbaffled Erlenmeyer vented cap shake flasks were used. Transfection shake speeds ranged from 70 (ExpiCHO) to 120 RPM (Expi293) with a 25mM shake platform swing, and post transfection culture temperatures ranged between 32° (ExpiCHO-S) or 37°C (Expi293 and ExpiCHO-S).

[00345] All larger scale protein expressions were purified using Mab SelectSure LX resin (GE Healthcare Life Sciences) on an ÄKTA Pure (GE Healthcare Life Sciences). After elution from the column with NaOAc, pH 3.0, antibodies were resolved using Preparative SEC (ÄKTA), and formulated in 10mM NaOAc, pH 5.5, 9% sucrose. Sample quality was confirmed using analytical SEC (Agilent), Endotoxin (Endosafe, Charles River), LC/MS, SDS-PAGE, and Biacore.

[00346] Table 7. Expression of the antibodies (200 mL production, ExpiCHO).

Construct: LC/HC	mg/L (media)
Ab495/Ab480	31.5
Ab495/Ab356	27.5
Ab1119/Ab480	5.32**
Ab1119/Ab356	93.2
Ab1119/Ab356	41.2
Ab1119/Ab387	33.4
Ab1119/Ab387	10.5
Ab1119/Ab170	34.8
Ab482/Ab387	26.6
Parental LC-HC	18.8

** In Expi293 24-DPW, productivity was ~72mg/L.

[00347] Table 8. Expression of the antibodies (200 mL production, ExpiCHO).

Construct: LC/HC	mg/L (media)
Ab356/Ab1120	~72
Ab480/Ab1120	~72
Ab356/Ab1121	~100
Ab480/Ab1121	~100
Ab356/Ab1122	~72
Ab480/Ab1122	~72
Ab356/Ab1127	~70
Ab480/Ab1127	~70
Ab356/Ab1129	~70
Ab1119/Ab480	5.32
Ab1119/Ab356	41.2
Parental LC-HC	18.8

6.3 Example 3: Biacore Analysis of CD47 Affinity

[00348] Materials and Methods:

[00349] The binding kinetics of anti-CD47 antibodies to the recombinant extracellular domain of CD47 were determined by using surface Plasmon resonance (SPR, MASS-1, Sierra Sensors; T200, Biacore, GE Healthcare Life Sciences). Anti-human Fc (P/N: BR-1008-39 (GE Healthcare Life Sciences)) was immobilized on a High Capacity Amine chip (P/N: SPR-AS-HCA, Sierra sensors) or CM5-S Chip (GE Healthcare Life Sciences). CD47 antibodies were captured on Human IgG FC and CD47-ECD was flowed over the surface at various concentrations ranging from zero (for double referencing) to 100nM. In order to determine K_D 's, antibodies were ranked using a 1:1 Langmuir model. The results are shown in Table 9, and show that the variant antibodies have retained substantial binding affinity to CD47.

[00350] Table 9. Results of Biacore analysis.

Affinity - Biacore			
Construct: LC/HC	ka(1/Ms)	kd(1/s)	KD(M)
Ab495/Ab480	3.29E+06	4.34E-03	1.32E-09
Ab495/Ab356	3.13E+06	4.26E-03	1.36E-09
Ab1119/Ab480	1.02E+07	5.77E-03	5.64E-10
Ab1119/Ab356	1.02E+07	6.47E-03	6.35E-10
Ab1119/Ab356	9.85E+06	5.90E-03	5.99E-10

Ab1119/Ab387	1.03E+07	5.71E-03	5.56E-10
Ab1119/Ab387	1.04E+07	5.52E-03	5.29E-10
Ab1119/Ab170	1.04E+07	5.83E-03	5.62E-10
Ab482/Ab387	9.93E+06	5.49E-03	5.53E-10
Ab356/Ab1120	2.69E+06	2.74E-03	1.02E-09
Ab480/Ab1120	2.28E+06	2.38E-03	1.05E-09
Ab356/Ab1121	2.53E+06	2.72E-03	1.08E-09
Ab480/Ab1121	2.67E+06	3.03E-03	1.14E-09
Ab356/Ab1122	2.28E+04	4.11E-03	7.79E-08
Ab480/Ab1122	2.33E+06	1.09E-02	4.68E-09
Ab356/Ab1127	2.22E+06	1.06E-02	4.76E-09
Ab480/Ab1127	2.57E+06	6.22E-03	2.42E-09
Ab1119/Ab480	1.02E+07	5.77E-03	5.64E-10
Ab1119/Ab356	9.85E+06	5.90E-03	5.99E-10
Parental LC-HC	7.94E+06	1.87E-03	2.36E-10

6.4 Example 4: Phagocytosis and Flow Cytrometry

[00351] Materials and Methods:

[00352] Phagocytosis screening was conducted by differentiating macrophages from monocytes (Astarte #1009) by plating 3×10^4 cells in 100 μ L of complete AIM V media (#12055-091, Thermo Fisher; made complete by adding 50ng/mL rhuM-CSF (Peprotech, #300-25) and 10% FBS (Hyclone, #SH30088)) in a 96 well black walled plate and incubating in a 5% CO₂ atmosphere at 37°C. The culture was replenished with fresh media by removing 50 μ L of culture and feeding 100 μ L fresh media every 3-4 days for a total of 7 days.

[00353] Phagocytosis was assayed by serum starving the macrophages in incomplete AIM V media for two hours. During this incubation period, target cells (CCRF-CEM) from two donors (donor 1 and donor 2) were labeled with CFSE (Invitrogen, #C34554) at 0.3 μ M for 15 minutes at room temperature. Cells were rinsed twice with PBS (Hyclone, #SH30028.02) and resuspended at 8×10^5 /mL in AIM V media. Antibody dilutions were prepared at 0.01 μ g/ml to 10 μ g/ml in half log dilutions and then incubated with the target cell line for 10 minutes at room temperature (a small portion is retained for flow cytometric analysis/cell binding), after which 100 μ L of target cell/antibody suspension was added to the macrophage plates. Samples were treated in triplicate and with appropriate isotype controls.

[00354] For the phagocytosis assay, the plate was spun at 500 RPM for one minute to establish cell contacts, and then incubated for 3 hours at 37°C, 5% CO₂, and in the dark. After

the incubation, the plate was washed by hand with PBS and stained with an 1:500 anti-CD14 APC conjugate (Biolegend 325608) for 15 minutes in the dark. Finally, the plate was imaged on a high content imager (Operetta, Perkin Elmer) using the FITC and Alexa 647 channel. For data analysis, cells Alexa 647 and FITC positive cells were identified, with the % of phagocytosed cells=(FITC positive and Alexa 647 positive/ Alexa 647 Cells) * 100 = % Phagocytosis

[00355] The results for the antibodies listed in Tables 5 and 6, above, are shown in Table 10 and representative data are shown in Figure 4. The results show that the variant antibodies have retained the desirable ability to promote phagocytosis of target cells.

[00356] Table 10. Phagocytosis results.

Phagocytosis EC50 (ug/mL)		
Construct: LC/HC	Donor 1	Donor 2
Ab495/Ab480	0.59	0.94
Ab495/Ab356	0.68	0.92
Ab1119/Ab480	0.19	0.24
Ab1119/Ab356	0.31	0.15
Ab1119/Ab356	0.14	0.4
Ab1119/Ab387	0.14	0.52
Ab1119/Ab387	0.5	0.21
Ab1119/Ab170	0.15	0.62
Ab482/Ab387	0.15	0.17
Ab356/Ab1120	0.68	1.82
Ab480/Ab1120	0.73	2.01
Ab356/Ab1121	0.48	1.29
Ab480/Ab1121	0.43	1.42
Ab356/Ab1122	1.07	1.83
Ab480/Ab1122	1.1	1.84
Ab356/Ab1127	0.66	0.96
Ab480/Ab1127	1.88	1.95
Ab356/Ab1129	12.8	n.d.
Ab1119/Ab480	0.44	0.71
Ab1119/Ab356	0.36	0.94
Parental LC-HC	0.38	0.13

[00357] For flow cytometric staining, excess opsonized cells were transferred to a clean 96-well round bottom plate, rinsed with PBS, and incubated with a 1:1000 dilution of anti-human alexa conjugate 647 (ThermoFisher, A-21445) in FACS buffer (BD Biosciences, 554656). Samples were incubated for 30 minutes at room temperature, rinsed 2x and then

resuspended in FACS buffer and analyzed on the Attune. The results are shown in Tables 11 and 12 and representative data are shown in Figure 4. The EC50 values refer to the concentration that gives half the maximum binding measured as median fluorescent intensity, and was determined by non-linear fit of a sigmoidal dose response within the GraphPad Prism software. The results show that the variant antibodies have retained substantial binding affinity to cell surface-expressed CD47.

[00358] Table 11. Flow cytometry analysis results.

Cell Binding (a-FACS), EC50(μ g/ml)	
Construct: LC/HC	Cell Binding (a-FACS)
Ab495/Ab480	0.066
Ab495/Ab356	0.035
Ab1119/Ab480	0.012
Ab1119/Ab356	0.035
Ab1119/Ab356	0.014
Ab1119/Ab387	0.011
Ab1119/Ab387	0.014
Ab1119/Ab170	0.015
Ab482/Ab387	0.014
Parental LC-HC	0.014

[00359] Table 12. Flow cytometry analysis results.

Cell Binding (a-FACS), EC50(μ g/ml)		
Construct: LC/HC	Donor 1	Donor 2
Ab356/Ab1120	0.17	0.16
Ab480/Ab1120	0.33	0.17
Ab356/Ab1121	0.19	0.16
Ab480/Ab1121	0.17	0.17
Ab356/Ab1122	0.17	0.22
Ab480/Ab1122	0.16	0.17
Ab356/Ab1127	0.11	0.15
Ab480/Ab1127	0.08	0.2
Ab356/Ab1129	0.16	n.d.
Ab1119-Ab480	0.04	0.07
Ab1119-Ab356	0.06	0.16
Parental LC-HC	n.d.	n.d.

6.5 Example 5: Hemagglutination

[00360] Materials and Methods:

[00361] Antibodies were tested for the unwanted ability to hemagglutinate platelets. In this assay, non-hemagglutinated RBCs settle to the bottom of a 96-well plate, whereas hemagglutinated RBCs form a dispersed red haze. Human RBCs (Innovative Research, IPLA-WB3) were washed by dilution of 2mL of RBCs with 10mL of 1x dPBS (pH 7.4) in a 15mL conical tube. After centrifuging RBCs for 10 min. at 500xg, the supernatant was aspirated, 12mL of dPBS is added and RBCs are mixed by tube inversion. The spin and aspiration steps were repeated and cells were resuspended in 8mL dPBS and used immediately or stored for 3-5 days at 4°C.

[00362] Antibodies were prepared as 2x stocks in PBS and diluted in a 3x dilution series so that the final concentration range tested was between 1000nM to 51pM. A control antibody known to cause hemagglutination was included as a positive control, and no antibody was used as a negative control. Using an electronic P1200 multichannel pipette, 50 µL of each antibody titration was added to all wells of a u-bottom 96-well plate, and then followed by 50 µL of washed 20% RBC solution to all wells. No mixing was necessary as the injection force from the pipette is enough to mix the samples. The plate was then incubated at 37°C for at least 1.5 hours to 12 hours (overnight), and no visual difference in the results was observed within that time frame. The plate was visualized from the top. Negative (non-hemagglutination) results appeared as punctate red dots, while positive (hemagglutination) results appeared as a dispersed red haze. Advantageously, none of the anti-CD47 antibodies listed in Tables 5 and 6, above, resulted in hemagglutination.

6.6 Example 6: Solubility

[00363] Materials and Methods:

[00364] The colloidal stability, or degree of intermolecular attraction between protein molecules, may be assessed by PEG precipitation. PEG is preferentially excluded from the protein for steric reasons, which in turn causes an increase in the osmotic pressure of the bulk solvent. This increase in osmotic pressure enhances the intrinsic attractive interaction forces (hydrophobic, electrostatic, *etc.*) between proteins. Depending on the strength of these interactions, aggregation/precipitation will occur at different PEG concentrations. Proteins with strong intermolecular interactions (low colloidal stability) precipitate at low PEG concentrations, while higher PEG concentrations are required to precipitate proteins with greater repulsive intermolecular interactions (high colloidal stability).

[00365] PEG solutions (EMD, Cat# PX1286L-4) of 200 μ L were prepared containing PEG 6000 MW ranging between 10-20% (or higher or lower if warranted) in 1% increments and antibodies with a final concentration of 1mg/mL. Solutions were mixed using a pipet and incubated overnight at 4°C. Samples were centrifuged in a pre chilled (4°C) centrifuge for 5 minutes at 25,259xg and supernatants were transferred to a well of a 96-well plate. The protein concentration was measured by absorbance at 280 nm and plotted as protein concentration vs. PEG concentration in a sigmoid data fit model. Data is reported as the PEG % at which 50% of the antibody is soluble. The results for the antibodies tested are shown in Figure 5 and Table 13, below. The results show that the variant antibodies are highly soluble and, in fact, are substantially more soluble than the parental antibody.

[00366] Table 13. Solubility analysis results.

Construct: LC/HC	Solubility Assessment (midpoint)
Ab495/Ab480	18.26
Ab495/Ab356	18.12
Ab1119/Ab480	18.93
Ab1119/Ab356	18.48
Ab1119/Ab356	18.3
Ab1119/Ab387	18.52
Ab1119/Ab387	18.2
Ab1119/Ab170	18.4
Ab482/Ab387	18.85
Parental LC-HC	no fit

6.7 Example 7: Stability

[00367] Materials and Methods:

[00368] Antibodies were assessed for conformational stability by Differential Scanning Calorimetry (NanoDSC, TA Instruments). An effective means of limiting aggregation for proteins that aggregate through non-native or partially unfolded intermediate states is to increase conformational stability. Conformational stability may be assessed by thermal denaturation studies for those proteins that refold upon cooling. In cases where protein thermal unfolding is not reversible, the midpoint of the thermal unfolding transition or “apparent melting temperature” (T_m^{app}) is often reported as a surrogate for conformational stability when comparing formulation or different protein constructs.

[00369] Prior to running the Differential Scanning Calorimetry (DSC) assay, reference and sample cells were cleaned with 1% Liquinox and flushed with Milli-Q water. De-gassed formulation buffer was loaded into the reference and sample cells and 3 atm of pressure was applied. Cells were scanned from 20 to 100°C at 1°C.min⁻¹ with a 600 second equilibration at 20°C, and the cell contents were removed. Antibodies were diluted to 0.5-2 mg/mL in formulation buffer, degassed, and loaded into reference or sample cells and scanned using the same parameters. Data analysis was performed using NanoAnalyze software where the buffer run was subtracted, the data was converted to Molar Heat Capacity, and a baseline was established so that each antibody Gaussian curve may be fitted in order to determine T_m^{app}. Results for the antibodies tested using this assay are shown in Figure 6 and Table 14, below. The results show that the variant antibodies have higher stability than the parental antibody.

[00370] Table 14. Stability analysis results.

Construct: LC/HC	T _m ^{app} (°C)
Ab495/Ab480	62.4
Ab495/Ab356	76.8
Ab1119/Ab480	77.4
Ab1119/Ab356	73.4
Ab1119/Ab356	76.6
Ab1119/Ab387	73.3
Ab1119/Ab387	77.4
Ab1119/Ab170	70.9
Ab482/Ab387	72.3
Parental LC-HC	59.9

[00371] All references (*e.g.*, publications or patents or patent applications) cited herein are incorporated herein by reference in their entirety as if each individual reference (*e.g.*, publication or patent or patent application) was specifically and individually indicated to be incorporated by reference in its entirety. In the case of any conflict, this specification will control.

[00372] As used herein, the singular forms “a”, “and,” and “the” include plural referents unless the context clearly indicates otherwise. Thus, for example, reference to “a peptide sequence” includes a plurality of such sequences and so forth.

[00373] Other embodiments are within the following claims.

CLAIMS

1. An antibody or an antigen-binding fragment thereof, comprising a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH FR1, VH FR2, VH FR3 and VH FR4 comprise the amino acid sequence of $X_{H1}QX_{H3}QLVQSGAEVKKX_{H5}GX_{H6}SVKVSCKAS$ (SEQ ID NO: 5),

WVRQAPGX_{H12}X_{H13}LEWMG (SEQ ID NO: 6),

YAKKX_{H16}QX_{H17}RVTX_{H18}TX_{H19}DX_{H21}SX_{H22}STAYMELX_{H25}SLRX_{H31}X_{H27}DTAX_{H28}YYC (SEQ ID NO: 7), and

WGX_{H29}GTX_{H30}VTVSS (SEQ ID NO: 4) respectively,

wherein X_{H1} is M or no amino acid, X_{H3} is M, X_{H5} is P or T, X_{H6} is A, S, or T, X_{H12} is K, X_{H13} is G, R, or A, X_{H16} is F or L, X_{H17} is G, D, or E, X_{H18} is M or I, X_{H19} is R, T, E or A, X_{H21} is T, R, M, E, or K, X_{H22} is I, A T, or M, X_{H25} is S or R, X_{H31} is S or A, X_{H27} is D or E, and X_{H28} is V or M, X_{H29} is Q or R, and X_{H30} is L, M or T;

wherein the antibody or antigen-binding fragment thereof specifically binds to CD47 and comprises a VH that comprises four VH framework regions (VH FR1-4) and three VH complementarity determining regions (VH CDR1-3) in the following N-terminal to C-terminal order: VH FR1-VH CDR1-VH FR2-VH CDR2-VH FR3-VH CDR3-VH FR4, wherein VH CDR1 comprises the amino acid sequence of GFNIKDYLYLH (SEQ ID NO: 59); VH CDR2 comprises the amino acid sequence of WIDPDQGDTE (SEQ ID NO: 60); and VH CDR3 comprises the amino acid sequence of NAAYGSSSYPM DY (SEQ ID NO: 61);

wherein the antibody or antigen-binding fragment thereof comprises a VL that comprises four VL framework regions (VL FR1-4) and three VL complementarity determining regions (VL CDR1-3) in the following N-terminal to C-terminal order: VL FR1-VL CDR1-VL FR2-VL CDR2-VL FR3-VL CDR3-VL FR4, wherein:

(A) VL CDR1 comprises the amino acid sequence of $X_{C1}ASQDIHRYLS$ (SEQ ID NO: 62), wherein X_{C1} is K or R; VL CDR2 comprises the amino acid sequence of RANRLVS (SEQ ID NO: 63); and VL CDR3 comprises the amino acid sequence of LQYDEFPYT (SEQ ID NO: 64); or

(B) VL CDR1 comprises the amino acid sequence of $X_{C1}ASQDIHRYLS$ (SEQ ID NO: 62), wherein X_{C1} is K or R; VL CDR2 comprises the amino acid sequence of $RX_{C2}X_{C3}RFVD$ (SEQ ID NO: 65), wherein X_{C2} is any amino acid with a polar or charged side chain, and X_{C3} is V, I, E, or S; and VL CDR3 comprises the amino acid sequence of $LQYDEFPYT$ (SEQ ID NO: 64).

2. The antibody or antigen-binding fragment of claim 1, wherein X_{H1} is M or no amino acid, X_{H3} is M, X_{H5} is P, X_{H6} is S, X_{H12} is K, X_{H13} is G, X_{H16} is F, X_{H17} is G, X_{H18} is I, X_{H19} is R, X_{H21} is R, X_{H22} is T, X_{H25} is R, X_{H31} is A, X_{H27} is E, and X_{H28} is V, X_{H29} is Q, and X_{H30} is L.

3. The antibody or antigen-binding fragment of claim 1, wherein X_{H1} is M or no amino acid, X_{H3} is M, X_{H5} is P, X_{H6} is S, X_{H12} is K, X_{H13} is G, X_{H16} is F, X_{H17} is G, X_{H18} is I, X_{H19} is R, X_{H21} is R, X_{H22} is T, X_{H25} is R, X_{H31} is A, X_{H27} is E, and X_{H28} is V, X_{H29} is Q, and X_{H30} is T.

4. The antibody or antigen-binding fragment of claim 1, wherein X_{H1} is M or no amino acid, X_{H3} is M, X_{H5} is P, X_{H6} is S, X_{H12} is K, X_{H13} is G, X_{H16} is F, X_{H17} is G, X_{H18} is I, X_{H19} is R, X_{H21} is R, X_{H22} is T, X_{H25} is R, X_{H31} is S, X_{H27} is E, and X_{H28} is V, X_{H29} is Q, and X_{H30} is L.

5. The antibody or antigen-binding fragment of claim 1, wherein X_{H1} is M or no amino acid, X_{H3} is M, X_{H5} is P, X_{H6} is S, X_{H12} is K, X_{H13} is G, X_{H16} is F, X_{H17} is G, X_{H18} is I, X_{H19} is R, X_{H21} is R, X_{H22} is T, X_{H25} is R, X_{H31} is S, X_{H27} is E, and X_{H28} is V, X_{H29} is Q, and X_{H30} is T.

6. The antibody or antigen-binding fragment of any of claims 1-5, wherein VL FR1, VL FR2, VL FR3 and VL FR4 comprise the amino acid sequence of $NIQMTQSPSX_{L1}X_{L2}SASVGDRVTITC$ (SEQ ID NO: 8); $WX_{L3}QQKPGKX_{L4}PKHLIY$ (SEQ ID NO: 9); $GVPSRFSGSGSGTEFTLTISLQPEDFATYYC$ (SEQ ID NO: 10); and $FGGGTKVEIK$ (SEQ ID NO: 11), respectively, wherein X_{L1} is A or S, X_{L2} is M or L, X_{L3} is F or Y, and X_{L4} is V or A.

7. The antibody or antigen-binding fragment of claim 6, wherein X_{L1} is S, X_{L2} is L, X_{L3} is F, and X_{L4} is V.
8. The antibody or antigen-binding fragment of claim 6, wherein X_{L1} is S, X_{L2} is L, X_{L3} is Y, and X_{L4} is A.
9. The antibody or antigen-binding fragment of claim 6, wherein X_{L1} is S, X_{L2} is M, X_{L3} is F, and X_{L4} is V.
10. The antibody or antigen-binding fragment of claim 1, wherein X_{C2} is Y, E, or H.
11. The antibody or antigen-binding fragment of any of claims 1-10, which comprises a heavy chain constant region that is a human constant region.
12. The antibody or antigen-binding fragment of any of claims 1-11, which comprises a light chain constant region selected from the group consisting of a human kappa constant region and a human lambda constant region.
13. A pharmaceutical composition comprising a therapeutically effective amount of the antibody or antigen-binding fragment of any of claims 1-12, and a pharmaceutically acceptable carrier.
14. Use of an antibody or antigen-binding fragment as defined in any of claims 1-12 or a pharmaceutical composition as defined in claim 13 in the manufacture of a medicament for treating cancer in a subject in need thereof.
15. A polynucleotide comprising a nucleotide sequence encoding the antibody or antigen-binding fragment of any of claims 1-13.
16. A vector comprising the polynucleotide of claim 15.

17. An isolated cell comprising the polynucleotide of claim 15.

18. A method of making an antibody or antigen-binding fragment thereof, comprising (a) culturing an isolated cell comprising the polynucleotide of claim 15; and (b) isolating the antibody or antigen-binding fragment thereof.