

ANTIBODIES AGAINST SARS-COV-2

STATEMENT REGARDING SEQUENCE LISTING

The Sequence Listing associated with this application is provided in text format in lieu of a paper copy, and is hereby incorporated by reference into the
5 specification. The name of the text file containing the Sequence Listing is 930585_409WO_SEQUENCE_LISTING.txt. The text file is 489 KB, was created on May 7, 2021, and is being submitted electronically via EFS-Web.

BACKGROUND

A novel betacoronavirus emerged in Wuhan, China, in late 2019. As of May 2,
10 2021, approximately 152 million cases of infection by this virus (termed, among other names, SARS-CoV-2 and Wuhan coronavirus) were confirmed worldwide, and had resulted in approximately 3.195 million deaths. Therapies for preventing or treating SARS-CoV-2 infection are needed.

15 SUMMARY

In one aspect, provided herein is an antibody, or antigen-binding fragment thereof, comprising a heavy chain variable domain (VH) comprising a CDRH1, a CDRH2, and a CDRH3, and a light chain variable domain (VL) comprising a CDRL1, a CDRL2, and a CDRL3, wherein: (i) the CDRH1 comprises or consists of the amino
20 acid sequence according to any one of SEQ ID NOs.: 400, 23, 33, 43, 53, 63, 75, 85, 97, 107, 120, 130, 140, 147, 160, 170, 174, 183, 190, 199, 209, 219, 229, 241, 255, 265, 275, 285, 299, 313, 323, 333, 370, 380, 390, 410, 420, 430, 435, 445, 455, 465, 475, 485, 495, 505, 515, 525, 535, 545, 555, 565, 575, 585, 595, 605, 615, 631, and 693, or a sequence variant thereof comprising one, two, or three acid substitutions, one or more
25 of which substitutions is optionally a conservative substitution and/or is a substitution to a germline-encoded amino acid; (ii) the CDRH2 comprises or consists of the amino acid sequence according to any one of SEQ ID NOs.: 401, 24, 34, 44, 54, 64, 76, 86, 98, 108, 121, 131, 141, 148, 151, 161, 171, 184, 200, 210, 220, 230, 242, 256, 266, 276,

286, 300, 314, 324, 334, 352, 360, 362, 364, 366, 371, 381, 391, 411, 421, 431, 436,
446, 456, 466, 476, 486, 496, 506, 516, 526, 536, 546, 556, 566, 576, 586, 596, 606,
616, 625, 632, 635, 637, 639, 641, 643, 645, 647, 649, 651, 653, 655, 657, 659, 661,
663, 665, 667, 669, 671, 673, 675, 677, 679, 681, 683, 685, and 694, or a sequence
5 variant thereof comprising one, two, or three amino acid substitutions, one or more of
which substitutions is optionally a conservative substitution and/or is a substitution to a
germline-encoded amino acid; (iii) the CDRH3 comprises or consists of the amino
acid sequence according to any one of SEQ ID NOs.: 766, 25, 35, 45, 55, 65, 77, 87, 99,
109, 122, 132, 142, 149, 162, 164, 165, 172, 176, 177, 179, 180, 185, 187, 188, 201,
10 211, 221, 231, 243, 257, 267, 277, 287, 301, 315, 325, 335, 354, 372, 382, 392, 412,
422, 432, 437, 447, 457, 467, 477, 487, 497, 507, 517, 527, 537, 547, 557, 567, 577,
587, 597, 607, 617, 627, 633, 695, 751, 753, 755, 757, 760, 763, 765, and 402, or a
sequence variant thereof comprising one, two, or three amino acid substitutions, one or
more of which substitutions is optionally a conservative substitution and/or is a
15 substitution to a germline-encoded amino acid; (iv) the CDRL1 comprises or consists
of the amino acid sequence according to any one of SEQ ID NOs.: 404, 27, 37, 47, 57,
67, 79, 89, 101, 111, 124, 134, 144, 152, 155, 156, 158, 159, 166, 181, 192, 203, 213,
223, 233, 245, 259, 269, 279, 289, 303, 317, 327, 337, 356, 374, 384, 394, 414, 424,
439, 449, 459, 469, 479, 489, 499, 509, 519, 529, 539, 549, 559, 569, 579, 589, 599,
20 609, 619, 687, and 697, or a sequence variant thereof comprising one, two, or three
amino acid substitutions, one or more of which substitutions is optionally a
conservative substitution and/or is a substitution to a germline-encoded amino acid; (v)
the CDRL2 comprises or consists of the amino acid sequence according to any one of
SEQ ID NOs.: 405, 28, 38, 48, 58, 68, 80, 90, 102, 112, 125, 135, 145, 153, 167, 182,
25 193, 204, 214, 224, 234, 246, 260, 270, 280, 290, 304, 318, 328, 338, 375, 385, 395,
415, 425, 440, 450, 460, 470, 480, 490, 500, 510, 520, 530, 540, 550, 560, 570, 580,
590, 600, 610, 620, 688, and 698, or a sequence variant thereof comprising one, two, or
three amino acid substitutions, one or more of which substitutions is optionally a
conservative substitution and/or is a substitution to a germline-encoded amino acid;
30 and/or (vi) the CDRL3 comprises or consists of the amino acid sequence according to

any one of SEQ ID NOs.: 406, 29, 39, 49, 59, 69, 81, 91, 103, 113, 126, 136, 146, 169, 195, 197, 205, 215, 225, 235, 247, 261, 271, 281, 291, 305, 319, 329, 339, 358, 376, 386, 396, 416, 426, 441, 451, 461, 471, 481, 491, 501, 511, 521, 531, 541, 551, 561, 571, 581, 591, 601, 611, 621, 689, 699, 745 and 747, or a sequence variant thereof comprising having one, two, or three amino acid substitutions, one or more of which substitutions is optionally a conservative substitution and/or is a substitution to a germline-encoded amino acid, wherein the antibody or antigen-binding fragment binds SARS-CoV-2 glycoprotein (S).

10 In another aspect, provided herein is an isolated polynucleotide encoding the antibody or antigen-binding fragment of the disclosure, or encoding a VH, a heavy chain, a VL, and/or a light chain of the antibody or the antigen-binding fragment, wherein, optionally, the polynucleotide comprises deoxyribonucleic acid (DNA) or ribonucleic acid (RNA), wherein the RNA further optionally comprises messenger RNA (mRNA).

15 In another aspect, provided herein is a recombinant vector comprising the polynucleotide of the disclosure.

In another aspect, provided herein is a host cell comprising the polynucleotide of the disclosure and/or the vector of the disclosure, wherein the polynucleotide is heterologous to the host cell.

20 In another aspect, provided herein is a composition comprising: (i) the antibody or antigen-binding fragment of the disclosure; (ii) the polynucleotide of the disclosure; (iii) the recombinant vector of the disclosure; and/or (iv) the host cell of the disclosure, and a pharmaceutically acceptable excipient, carrier, or diluent.

25 In another aspect, provided herein is a use of the antibody or antigen-binding fragment of the disclosure in the manufacture of a medicament for treating a SARS-CoV-2 infection in a subject.

In another aspect, provided herein is a use of the composition of the disclosure in the manufacture of a medicament for treating a SARS-CoV-2 infection in a subject.

30 In another aspect, provided herein is an *in vitro* method for producing the antibody or antigen-binding fragment of the disclosure, wherein the method comprises

culturing a host cell expressing the antibody or antigen-binding fragment under conditions and for a time sufficient to produce the antibody, or the antigen-binding fragment.

BRIEF DESCRIPTION OF THE DRAWINGS

5 **Figures 1A-1D** show binding of certain antibodies to SARS-CoV-2 Spike protein RBD and SARS-CoV-1 Spike protein RBD. Human monoclonal antibodies isolated from patients who recovered from SARS-CoV-2 infection were recombinantly expressed and tested for RBD binding by ELISA. Figure 1A shows binding of five antibodies, Figure 1B and Figure 1C each show binding of seven antibodies, and Figure 10 1D shows binding of four antibodies. Two antibodies in the top panel of Figure 1B are shown using black symbols. In Figure 1B, S2X28 binding is represented by a line that stays at or near zero OD for the full range of concentrations tested. In Figure 1B (top), S2X41 binding is represented by the curve with an EC₅₀ of approximately 20.01 ng/ml. In each of Figures 1A-1D, the top panel shows binding to SARS-CoV-2 RBD and the 15 bottom panel shows binding to SARS-CoV-1 RBD. The boxes on the right side of each figure, where present, indicate the calculated EC₅₀ value for the indicated antibody.

CLAIMS

What is claimed is:

1. An antibody, or antigen-binding fragment thereof, comprising a heavy chain variable domain (VH) comprising a CDRH1, a CDRH2, and a CDRH3, and a light chain variable domain (VL) comprising a CDRL1, a CDRL2, and a CDRL3, wherein:

(i) the CDRH1 comprises or consists of the amino acid sequence according to any one of SEQ ID NOs.: 400, 23, 33, 43, 53, 63, 75, 85, 97, 107, 120, 130, 140, 147, 160, 170, 174, 183, 190, 199, 209, 219, 229, 241, 255, 265, 275, 285, 299, 313, 323, 333, 370, 380, 390, 410, 420, 430, 435, 445, 455, 465, 475, 485, 495, 505, 515, 525, 535, 545, 555, 565, 575, 585, 595, 605, 615, 631, and 693, or a sequence variant thereof comprising one, two, or three acid substitutions, one or more of which substitutions is optionally a conservative substitution and/or is a substitution to a germline-encoded amino acid;

(ii) the CDRH2 comprises or consists of the amino acid sequence according to any one of SEQ ID NOs.: 401, 24, 34, 44, 54, 64, 76, 86, 98, 108, 121, 131, 141, 148, 151, 161, 171, 184, 200, 210, 220, 230, 242, 256, 266, 276, 286, 300, 314, 324, 334, 352, 360, 362, 364, 366, 371, 381, 391, 411, 421, 431, 436, 446, 456, 466, 476, 486, 496, 506, 516, 526, 536, 546, 556, 566, 576, 586, 596, 606, 616, 625, 632, 635, 637, 639, 641, 643, 645, 647, 649, 651, 653, 655, 657, 659, 661, 663, 665, 667, 669, 671, 673, 675, 677, 679, 681, 683, 685, and 694, or a sequence variant thereof comprising one, two, or three amino acid substitutions, one or more of which substitutions is optionally a conservative substitution and/or is a substitution to a germline-encoded amino acid;

(iii) the CDRH3 comprises or consists of the amino acid sequence according to any one of SEQ ID NOs.: 766, 25, 35, 45, 55, 65, 77, 87, 99, 109, 122, 132, 142, 149, 162, 164, 165, 172, 176, 177, 179, 180, 185, 187, 188, 201, 211, 221, 231, 243, 257, 267, 277, 287, 301, 315, 325, 335, 354, 372, 382, 392, 412, 422, 432, 437, 447, 457, 467, 477, 487, 497, 507, 517, 527, 537, 547, 557, 567, 577, 587, 597, 607, 617, 627,

633, 695, 751, 753, 755, 757, 760, 763, 765, and 402, or a sequence variant thereof comprising one, two, or three amino acid substitutions, one or more of which substitutions is optionally a conservative substitution and/or is a substitution to a germline-encoded amino acid;

(iv) the CDRL1 comprises or consists of the amino acid sequence according to any one of SEQ ID NOs.: 404, 27, 37, 47, 57, 67, 79, 89, 101, 111, 124, 134, 144, 152, 155, 156, 158, 159, 166, 181, 192, 203, 213, 223, 233, 245, 259, 269, 279, 289, 303, 317, 327, 337, 356, 374, 384, 394, 414, 424, 439, 449, 459, 469, 479, 489, 499, 509, 519, 529, 539, 549, 559, 569, 579, 589, 599, 609, 619, 687, and 697, or a sequence variant thereof comprising one, two, or three amino acid substitutions, one or more of which substitutions is optionally a conservative substitution and/or is a substitution to a germline-encoded amino acid;

(v) the CDRL2 comprises or consists of the amino acid sequence according to any one of SEQ ID NOs.: 405, 28, 38, 48, 58, 68, 80, 90, 102, 112, 125, 135, 145, 153, 167, 182, 193, 204, 214, 224, 234, 246, 260, 270, 280, 290, 304, 318, 328, 338, 375, 385, 395, 415, 425, 440, 450, 460, 470, 480, 490, 500, 510, 520, 530, 540, 550, 560, 570, 580, 590, 600, 610, 620, 688, and 698, or a sequence variant thereof comprising one, two, or three amino acid substitutions, one or more of which substitutions is optionally a conservative substitution and/or is a substitution to a germline-encoded amino acid; and/or

(vi) the CDRL3 comprises or consists of the amino acid sequence according to any one of SEQ ID NOs.: 406, 29, 39, 49, 59, 69, 81, 91, 103, 113, 126, 136, 146, 169, 195, 197, 205, 215, 225, 235, 247, 261, 271, 281, 291, 305, 319, 329, 339, 358, 376, 386, 396, 416, 426, 441, 451, 461, 471, 481, 491, 501, 511, 521, 531, 541, 551, 561, 571, 581, 591, 601, 611, 621, 689, 699, 745 and 747, or a sequence variant thereof comprising having one, two, or three amino acid substitutions, one or more of which substitutions is optionally a conservative substitution and/or is a substitution to a germline-encoded amino acid,

wherein the antibody or antigen-binding fragment ~~is capable of binding to a surface glycoprotein of~~ binds SARS-CoV-2 glycoprotein (S)~~expressed on a cell surface of a host cell and/or on a virion.~~

~~2. The antibody or antigen-binding fragment of claim 1, which is capable of neutralizing a SARS-CoV-2 infection in an *in vitro* model of infection and/or in an *in vivo* animal model of infection and/or in a human.~~

~~32.~~ The antibody or antigen-binding fragment of ~~any one of claims 1-2~~claim 1, comprising CDRH1, CDRH2, CDRH3, CDRL1, CDRL2, and CDRL3 amino acid sequences of SEQ ID NOs.:

- (i) 400, 401, 766, and 404-406, respectively;
- (ii) 400-402 and 404-406, respectively;
- (iii) 43-45 and 47-49, respectively;
- (iv) 53-55 and 57-59, respectively;
- (v) 63-65 and 67-69, respectively;
- (vi) 75-77 and 79-81, respectively;
- (vii) 85-87 and 89-91, respectively;
- (viii) 97-99 and 101-103, respectively;
- (ix) 107-109 and 111-113, respectively;
- (x) 120-122 and 124-126, respectively;
- (xi) 130-132 and 134-136, respectively;
- (xii) 23 or 147, any one of 24, 148 or 151, 25 or 149, any one of 27, 152, 155, 156, 158, or 159, 28 or 153, and 29, respectively;
- (xiii) 43 or 160, 44 or 161, any one of 45, 162, 164, or 165, 47 or 166, 48 or 167, and 49 or 169, respectively;
- (xiv) any one of 130, 170, or 174, 130, 131, 132, 134 or 181, 135 or 182, and 136, respectively;
- (xv) any one of 53, 183, or 190, 54 or 184, any one of 55, 185, 187, or 188, 57 or 192, 58 or 193, and any one of 59, 195, or 197, respectively;

(xvi) 199-201 and 203-205, respectively;
 (xvii) 209-211 and 213-215, respectively;
 (xviii) 219-221 and 223-225, respectively;
 (xix) 229-231 and 233-235, respectively;
 (xx) 241-243 and 245-247, respectively;
 (xxi) 255-257 and 259-261, respectively;
 (xxii) 265-267 and 269-271, respectively;
 (xxiii) 275-277 and 279-281, respectively;
 (xxiv) 285-287 and 289-291, respectively;
 (xxv) 299-301 and 303-305, respectively;
 (xxvi) 313-315 and 317-319, respectively;
 (xxvii) 323-325 and 327-329, respectively;
 (xxviii) 333-335 and 337-339, respectively;
 (xxix) 229, 230 or 352, 231 or 354, and 233 or 356, 234, and 235 or 358,
 respectively;
 (xxx) 313, any one of 314, 360, 362, 364, or 366, 315 and 317-319,
 respectively;
 (xxxi) 370-372 and 374-376, respectively;
 (xxxii) 380-382 and 384-386, respectively;
 (xxxiii) 390-392 and 394-396, respectively;
 (xxxiv) 23-25 and 27-29, respectively;
 (xxxv) 410-412 and 414-416, respectively;
 (xxxvi) 420-422 and 424-426, respectively;
 (xxxvii) 435-437 and 439-441, respectively;
 (xxxviii) 445-447 and 449-451, respectively;
 (xxxix) 455-457 and 459-461, respectively;
 (xxxx) 465-467 and 469-471, respectively;
 (xxxxi) 475-477 and 479-481, respectively;
 (xxxxii) 485-487 and 489-491, respectively;
 (xxxxiii) 494-497 and 499-501, respectively;

(xxxxiv) 505-507 and 509-511, respectively;
 (xxxxv) 515-517 and 519-521, respectively;
 (xxxxvi) 525-527 and 529-531, respectively;
 (xxxxvii) 535-537 and 539-541, respectively;
 (xxxxviii) 545-547 and 549-551, respectively;
 (xxxxix) 555-557 and 559-561, respectively;
 (xxxxx) 565-567 and 569-571, respectively;
 (xxxxxi) 575-577 and 579-581, respectively;
 (xxxxxii) 585, 586 or 625, 587 or 627, and 589-591, respectively;
 (xxxxxiii) 595-597 and 599-601, respectively;
 (xxxxxiv) 605-607 and 609-611, respectively;
 (xxxxxv) 615-617 and 619-621, respectively;
 (xxxxxvi) 631, 632 or 635 or 637 or 639 or 641 or 643 or 645 or 647 or 649 or 651 or 653 or 655 or 657 or 659 or 661 or 663 or 665 or 667 or 669 or 671 or 673 or 675 or 677 or 679 or 681 or 683 or 685, 633, and 697-699, respectively;
 (xxxxxvii) 693-695 and 697-699, respectively;
 (xxxxxviii) 400, 401 and any one of 751, 753, 755, 757, or 760 and 404, 405, and any one of 745 or 747, respectively;
 (xxxxxxix) 585, 586, and 762 or 764 and 589-591, respectively;
 (xxxxxxx) 33-35 and 37-39, respectively; ~~or~~
 (xxxxxxxi) 400, 401, 766, 404, 405 or variant of 405 comprising one, two, or three amino acid ~~substitutions~~substitutions, wherein each of the one, two, or three amino acid substitutions is optionally a conservative amino acid substitution, and 406, respectively;
(xxxxxxxii) 631-633 and 687-689, respectively; or
(xxxxxxxiii) 631, 643, 633, 687, 688, and 689, respectively.

~~4. — An antibody, or antigen binding fragment thereof, comprising the CDRH1, the CDRH2, and the CDRH3 of the VH amino acid sequence set forth in SEQ ID NO.:399, and the CDRL1, the CDRL2 or a variant of the CDRL2 comprising one,~~

~~two, or three amino acid substitutions, wherein each of the one, two, or three amino acid substitutions is optionally a conservative amino acid substitution, and the CDRL3 of the VL amino acid sequence set forth in SEQ ID NO.:738, wherein the CDRs are according to IMGT;~~

~~and wherein the antibody or antigen binding fragment is capable of binding to a surface glycoprotein of SARS-CoV-2 expressed on a cell surface of a host cell and/or on a virion;~~

~~5. —An antibody, or an antigen binding fragment thereof, comprising a heavy chain variable domain (VH) comprising complementarity determining region (CDR)H1, CDRH2, and CDRH3, and a light chain variable domain (VL) comprising CDRL1, CDRL2, and CDRL3, wherein CDRH1, CDRH2, CDRH3, CDRL1, CDRL2, and CDRL3 comprise the amino acid sequences set forth in: (a) SEQ ID NOs.:400, 401, 766, 404, 405, and 406, respectively; (b) SEQ ID NOs.:400, 401, 769, 404, 405, and 406, respectively; (c) SEQ ID NOs.:400, 401, 770, 404, 405, and 406, respectively; (d) SEQ ID NOs.:400, 401, 771, 404, 405, and 406, respectively; (e) SEQ ID NOs.:400, 401, 772, 404, 405, and 406, respectively; (f) SEQ ID NOs.:400, 401, 773, 404, 405, and 406, respectively; (g) SEQ ID NOs.:400, 401, 766, 404, 405, and 745, respectively; (h) SEQ ID NOs.:400, 401, 769, 404, 405, and 745, respectively; (i) SEQ ID NOs.:400, 401, 770, 404, 405, and 745, respectively; (j) SEQ ID NOs.:400, 401, 771, 404, 405, and 745, respectively; (k) SEQ ID NOs.:400, 401, 772, 404, 405, and 745, respectively; (l) SEQ ID NOs.: 400, 401, 773, 405, 405, and 745, respectively; (m) SEQ ID NOs.:400, 401, 766, 404, 405, and 747, respectively; (n) SEQ ID NOs.:400, 401, 769, 404, 405, and 747, respectively; (o) SEQ ID NOs.:400, 401, 770, 404, 405, and 747, respectively; (p) SEQ ID NOs.:400, 401, 771, 404, 405, and 747, respectively; (q) SEQ ID NOs.:400, 401, 772, 404, 405, and 747, respectively; or (r) SEQ ID NOs.:400, 401, 773, 404, 405, and 747, respectively;~~

~~wherein the antibody or antigen binding fragment is capable of binding to a surface glycoprotein of SARS-CoV-2 expressed on a cell surface of a host cell and/or on a virion;~~

6. ~~The antibody or antigen binding fragment thereof of claim 5, comprising a heavy chain variable domain (VH) comprising a CDRH1, a CDRH2, and a CDRH3, and a light chain variable domain (VL) comprising a CDRL1, a CDRL2, and a CDRL3, wherein CDRH1, CDRH2, CDRH3, CDRL1, CDRL2, and CDRL3 comprise the amino acid sequences set forth in: (a) SEQ ID NOs.:400, 401, 766, 404, 405, and 406, respectively.~~

7. ~~The antibody or antigen binding fragment of any one of claims 4-6, comprising the amino acid sequences set forth in: (a) SEQ ID NOs.:400, 401, 402, 404, 405, and 406; (b) SEQ ID NOs.:400, 401, 751, 404, 405, and 406; (c) SEQ ID NOs.:400, 401, 753, 404, 405, and 406; (d) SEQ ID NOs.:400, 401, 755, 404, 405, and 406; (e) SEQ ID NOs.:400, 401, 757, 404, 405, and 406; (f) SEQ ID NOs.:400, 401, 760, 404, 405, and 406; (g) SEQ ID NOs.:400, 401, 402, 404, 405, and 745; (h) SEQ ID NOs.:400, 401, 751, 404, 405, and 745; (i) SEQ ID NOs.:400, 401, 753, 404, 405, and 745; (j) SEQ ID NOs.:400, 401, 755, 404, 405, and 745; (k) SEQ ID NOs.:400, 401, 757, 404, 405, and 745; (l) SEQ ID NOs.: 400, 401, 760, 404, 405, and 745; (m) SEQ ID NOs.:400, 401, 402, 404, 405, and 747; (n) SEQ ID NOs.:400, 401, 751, 404, 405, and 747; (o) SEQ ID NOs.:400, 401, 753, 404, 405, and 747; (p) SEQ ID NOs.:400, 401, 755, 404, 405, and 747; (q) SEQ ID NOs.:400, 401, 757, 404, 405, and 747; or (r) SEQ ID NOs.:400, 401, 760, 404, 405, and 747.~~

8. ~~The antibody or antigen binding fragment of any one of claims 4-7, comprising, in VH, the amino acid sequence set forth in SEQ ID NO.: 400, the amino acid sequence set forth in SEQ ID NO.:401, and the amino acid sequence set forth in SEQ ID NO.:402, and in VL, the amino acid sequence set forth in SEQ ID NO.:404, the amino acid sequence set forth in SEQ ID NO.:405, and the amino acid sequence set forth in SEQ ID NO.:406.~~

9. ~~An antibody, or an antigen binding fragment thereof, comprising a heavy chain variable domain (VH) comprising complementarity determining region~~

~~(CDR)H1, CDRH2, and CDRH3, and a light chain variable domain (VL) comprising CDRL1, CDRL2, and CDRL3, wherein CDRH1, CDRH2, CDRH3, CDRL1, CDRL2, and CDRL3 comprise the amino acid sequences set forth in SEQ ID NOs.:525, 526, 527, 529, 530, and 531, respectively,~~

~~and wherein the antibody or antigen binding fragment is capable of binding to a surface glycoprotein of SARS-CoV-2 expressed on a cell surface of a host cell and/or on a virion.~~

~~10. —An antibody, or an antigen binding fragment thereof, comprising a heavy chain variable domain (VH) comprising complementarity determining region (CDR)H1, CDRH2, and CDRH3, and a light chain variable domain (VL) comprising CDRL1, CDRL2, and CDRL3, wherein CDRH1, CDRH2, CDRH3, CDRL1, CDRL2, and CDRL3 comprise the amino acid sequences set forth in SEQ ID NOs.:585, 586 or 625, 587 or 627, 589, 590, and 591, respectively,~~

~~and wherein the antibody or antigen binding fragment is capable of binding to a surface glycoprotein of SARS-CoV-2 expressed on a cell surface of a host cell and/or on a virion.~~

~~11. —An antibody, or an antigen binding fragment thereof, comprising a heavy chain variable domain (VH) comprising complementarity determining region (CDR)H1, CDRH2, and CDRH3, and a light chain variable domain (VL) comprising CDRL1, CDRL2, and CDRL3, wherein CDRH1, CDRH2, CDRH3, CDRL1, CDRL2, and CDRL3 comprise the amino acid sequences set forth in SEQ ID NOs.:229, 230, 231, 233, 234, and 235, respectively,~~

~~wherein the antibody or antigen binding fragment is capable of binding to a surface glycoprotein of SARS-CoV-2 expressed on a cell surface of a host cell and/or on a virion.~~

~~123.~~ The antibody or antigen-binding fragment of ~~any one of claims 1–~~
~~44~~claim 1 or 2, wherein:

(i) the VH comprises or consists of an amino acid sequence having at least 85% (*e.g.*, 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98%, 99%, or 100%) identity to the amino acid sequence according to any one of SEQ ID NOs.: 399, 22, 32, 42, 52, 62, 72, 74, 84, 96, 106, 119, 129, 139, 150, 163, 173, 175, 178, 186, 189, 191, 198, 208, 218, 228, 240, 254, 264, 274, 284, 298, 312, 322, 332, 350, 351, 353, 359, 361, 363, 365, 367, 368, 369, 379, 389, 409, 419, 429, 434, 444, 454, 464, 474, 484, 494, 504, 514, 524, 534, 544, 554, 564, 574, 584, 594, 604, 614, 624, 626, 628, 630, 634, 636, 638, 640, 642, 644, 646, 648, 650, 652, 654, 656, 658, 660, 662, 664, 666, 668, 670, 672, 674, 676, 678, 680, 682, 684, 692, 740, 741, 742, 743, 748, 749, 750, 752, 754, 756, 758, 759, 761, 762, and 764, wherein the variation is optionally limited to one or more framework regions and/or the variation comprises one or more substitution to a germline-encoded amino acid; and/or

(ii) the VL comprises or consists of an amino acid sequence having at least 85% (*e.g.*, 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98%, 99%, or 100%) identity to the amino acid sequence according to any one of SEQ ID NOs.: 738, 26, 36, 46, 56, 66, 78, 88, 94, 100, 110, 123, 133, 143, 154, 157, 168, 194, 196, 202, 212, 222, 232, 238, 244, 250, 252, 258, 268, 278, 288, 294, 296, 302, 308, 310, 316, 326, 336, 355, 357, 373, 383, 393, 403, 413, 423, 438, 448, 458, 468, 478, 488, 498, 508, 518, 528, 538, 548, 558, 568, 578, 588, 598, 608, 618, 686, 696, 744, and 746, wherein the variation is optionally limited to one or more framework regions and/or the variation comprises one or more substitution to a germline-encoded amino acid.

~~13.—The antibody or antigen binding fragment of any one of claims 1–12, wherein the VH comprises or consists of an amino acid sequence having at least 85% identity to the amino acid sequence set forth in SEQ ID NO.:399 and the VL comprises or consists of an amino acid sequence having at least 85% identity to the amino acid sequence set forth in SEQ ID NO.:403 or SEQ ID NO.:738.~~

~~14. — The antibody or antigen binding fragment of any one of claims 1-13, wherein the VH comprises or consists of an amino acid sequence having at least 90% identity to the amino acid sequence set forth in SEQ ID NO.:399 and the VL comprises or consists of an amino acid sequence having at least 90% identity to the amino acid sequence set forth in SEQ ID NO.:403 or SEQ ID NO.:738.~~

~~15. — The antibody or antigen binding fragment of any one of claims 1-14, wherein the VH comprises or consists of an amino acid sequence having at least 95% identity to the amino acid sequence set forth in SEQ ID NO.:399 and the VL comprises or consists of an amino acid sequence having at least 95% identity to the amino acid sequence set forth in SEQ ID NO.:403 or SEQ ID NO.:738.~~

~~16. — The antibody or antigen binding fragment of any one of claims 1-15, wherein the VH comprises or consists of an amino acid sequence having at least 97% identity to the amino acid sequence set forth in SEQ ID NO.:399 and the VL comprises or consists of an amino acid sequence having at least 97% identity to the amino acid sequence set forth in SEQ ID NO.:403 or SEQ ID NO.:738.~~

~~17. — The antibody or antigen binding fragment of any one of claims 1-16, wherein the VH comprises or consists of an amino acid sequence having at least 99% identity to the amino acid sequence set forth in SEQ ID NO.:399 and the VL comprises or consists of an amino acid sequence having at least 99% identity to the amino acid sequence set forth in SEQ ID NO.:403 or SEQ ID NO.:738.~~

~~18. — The antibody or antigen binding fragment of any one of claims 1-12, wherein the VH and the VL have at least 85% identity (e.g., 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98%, 99%, or 100%) to the amino acid sequences set forth in:~~

~~(i) — SEQ ID NOs.:524 and 528, respectively;~~

~~(ii) — SEQ ID NOs.:584 or 624 or 626 or 628 and 588, respectively;~~

~~(iii) — SEQ ID NOs.:228 or 740 or 741 or 742 or 743 and 232,
respectively; or~~

~~(iv) — SEQ ID NOs.:228 or 740 or 741 or 742 or 743 and 238,
respectively.~~

~~194.~~ The antibody or antigen-binding fragment of any one of claims 1-
~~183~~, wherein the VH comprises or consists of any VH amino acid sequence set
forth in Table 2, and wherein the VL comprises or consists of any VL amino
acid sequence set forth in Table 2, wherein, optionally, the VH and the VL
comprise or consist of the amino acid sequences according to SEQ ID NOs.:

(i) 399 and 403 or 738, respectively;

(ii) 32 and 36, respectively;

(iii) 42 and 46, respectively;

(iv) 52 and 56, respectively;

(v) 62 and 66, respectively;

(vi) 72 and 66, respectively;

(vii) 74 and 78, respectively;

(viii) 84 and 88, respectively;

(ix) 84 and 88, respectively;

(x) 96 and 100, respectively;

(xi) 106 and 110, respectively;

(xii) 119 and 123, respectively; or

(xiii) 129 and 133, respectively;

(xiv) 22 or 150 and 26, 154, or 157, respectively;

(xv) 42 or 163 and 46 or 168, respectively;

(xvi) any one of 129, 173, 175, or 178 and 133, respectively;

(xvii) any one of 52, 186, 189, or 191 and any one of 56, 194, or 196,

respectively;

(xviii) 198 and 202, respectively;

(xix) 208 and 212, respectively;

(xx) 218 and 222, respectively;
 (xxi) 228 and 232 or 238, respectively;
 (xxii) 240 and any one of 244, 250, or 252, respectively;
 (xxiii) 254 and 258, respectively;
 (xxiv) 264 and 268, respectively;
 (xxv) 274 and 278, respectively; or
 (xxvi) 284 and any one of 288, 294, or 296, respectively;
 (xxvii) 298 and any one of 302, 308, or 310, respectively;
 (xxviii) 312 and 316, respectively;
 (xxix) 322 and 326, respectively;
 (xxx) 332 and 336, respectively;
 (xxxi) any one of 228, 350, 351, or 353 and 232, 238, 355, or 357, respectively;
 (xxxii) any one of 312, 359, 361, 363, 365, 367, or 368 and 316,
 respectively;
 (xxxiii) 369 and 373, respectively;
 (xxxiv) 379 and 383, respectively;
 (xxxv) 389 and 393, respectively;
 (xxxvi) 22 and 26, respectively;
 (xxxvii) 409 and 413, respectively;
 (xxxviii) 419 and 423, respectively;
 (xxxix) 434 and 438, respectively;
 (xxxx) 444 and 448, respectively;
 (xxxxi) 454 and 458, respectively;
 (xxxxii) 464 and 468, respectively;
 (xxxxiii) 474 and 478, respectively;
 (xxxxiv) 484 and 488, respectively;
 (xxxxv) 494 and 498, respectively;
 (xxxxvi) 504 and 508, respectively;
 (xxxxvii) 514 and 518, respectively;
 (xxxxviii) 524 and 528, respectively;

(xxxxix) 534 and 538, respectively;
 (xxxxx) 544 and 548, respectively;
 (xxxxxi) 554 and 558, respectively;
 (xxxxxii) 564 and 568, respectively;
 (xxxxxiii) 574 and 578, respectively;
 (xxxxxiv) 584 and 588, respectively;
 (xxxxxv) 594 and 598, respectively;
 (xxxxxvi) 604 and 608, respectively;
 (xxxxxvii) 614 and 618, respectively;
 (xxxxxviii) 624, 626, or 628 and 588, respectively;
 (xxxxxix) 630, 634, 636, 638, 640, 642, 644, 646, 648, 650, 652, 654,
 656, 658, 660, 662, 664, 666, 668, 670, 672, 674, 676, 678, 680, 682, or 684,
 and 686, respectively;
 (xxxxxx) 692 and 696, respectively;
 (xxxxxxxi) any one of 740-743 and 238, respectively;
 (xxxxxxxii) any one of 399, 748, 749, 750, 752, 754, 756, 758, 759, and
 761 and any one of 403, 744, and 746, respectively; or
 (xxxxxxxiii) 762 or 764 and 588, respectively.

~~20. — An antibody, or an antigen binding fragment thereof, comprising a heavy chain variable domain (VH) and a light chain variable domain (VL), wherein the VH comprises or consists of the amino acid sequence set forth in SEQ ID NO:399 and the VL comprises or consists of the amino acid sequence set forth in SEQ ID NO:738, wherein the antibody or antigen binding fragment is capable of binding to a surface glycoprotein of SARS-CoV-2 expressed on a cell surface of a host cell and/or on a virion.~~

~~21. — An antibody, or an antigen binding fragment thereof, comprising a heavy chain variable domain (VH) and a light chain variable domain (VL), wherein the~~

~~VH comprises or consists of the amino acid sequence set forth in SEQ ID NO:399 and the VL comprises or consists of the amino acid sequence set forth in SEQ ID NO:403, wherein the antibody or antigen binding fragment is capable of binding to a surface glycoprotein of SARS-CoV-2 expressed on a cell surface of a host cell and/or on a virion.~~

~~22. — An antibody, or an antigen binding fragment thereof, comprising a heavy chain variable domain (VH) and a light chain variable domain (VL), wherein the VH comprises or consists of the amino acid sequence set forth in any one of SEQ ID NOs:399, 748, 749, 750, 752, 754, 756, 758, 759, and 761, the VL comprises or consists of the amino acid sequence set forth in SEQ ID NO:403, wherein the antibody or antigen binding fragment is capable of binding to a surface glycoprotein of SARS-CoV-2 expressed on a cell surface of a host cell and/or on a virion.~~

~~23. — An antibody, or an antigen binding fragment thereof, comprising a heavy chain variable domain (VH) and a light chain variable domain (VL), wherein the VH comprises or consists of the amino acid sequence set forth in any one of SEQ ID NOs:399, 748, 749, 750, 752, 754, 756, 758, 759, and 761, the VL comprises or consists of the amino acid sequence set forth in SEQ ID NO:738, wherein the antibody or antigen binding fragment is capable of binding to a surface glycoprotein of SARS-CoV-2 expressed on a cell surface of a host cell and/or on a virion.~~

~~24. — An antibody, or an antigen binding fragment thereof, comprising a heavy chain variable domain (VH) and a light chain variable domain (VL), wherein the VH comprises or consists of the amino acid sequence set forth in any one of SEQ ID NOs:399, 748, 749, 750, 752, 754, 756, 758, 759, and 761, the VL comprises or consists of the amino acid sequence set forth in SEQ ID NO:744,~~

~~wherein the antibody or antigen binding fragment is capable of binding to a surface glycoprotein of SARS-CoV-2 expressed on a cell surface of a host cell and/or on a virion.~~

~~25.—An antibody, or an antigen binding fragment thereof, comprising a heavy chain variable domain (VH) and a light chain variable domain (VL), wherein the VH comprises or consists of the amino acid sequence set forth in any one of SEQ ID NOs:399, 748, 749, 750, 752, 754, 756, 758, 759, and 761, the VL comprises or consists of the amino acid sequence set forth in SEQ ID NO:746,~~

~~wherein the antibody or antigen binding fragment is capable of binding to a surface glycoprotein of SARS-CoV-2 expressed on a cell surface of a host cell and/or on a virion.~~

~~26.—An antibody, or an antigen binding fragment thereof, comprising a heavy chain variable domain (VH) and a light chain variable domain (VL), wherein the VH comprises or consists of the amino acid sequence set forth in SEQ ID NO:524 and the VL comprises or consists of the amino acid sequence set forth in SEQ ID NO:528,~~

~~wherein the antibody or antigen binding fragment is capable of binding to a surface glycoprotein of SARS-CoV-2 expressed on a cell surface of a host cell and/or on a virion.~~

~~27.—An antibody, or an antigen binding fragment thereof, comprising a heavy chain variable domain (VH) and a light chain variable domain (VL), wherein the VH comprises or consists of the amino acid sequence set forth in any one of SEQ ID NOs:584, 624, 626, and 628 and the VL comprises or consists of the amino acid sequence set forth in SEQ ID NO:588,~~

~~wherein the antibody or antigen binding fragment is capable of binding to a surface glycoprotein of SARS-CoV-2 expressed on a cell surface of a host cell and/or on a virion.~~

~~28.—An antibody, or an antigen binding fragment thereof, comprising a heavy chain variable domain (VH) and a light chain variable domain (VL), wherein the VH comprises or consists of the amino acid sequence set forth in any one of SEQ ID NOs: 228, 740, 741, 742, and 743, and the VL comprises or consists of the amino acid sequence set forth in SEQ ID NO: 232,~~

~~wherein the antibody or antigen binding fragment is capable of binding to a surface glycoprotein of SARS-CoV-2 expressed on a cell surface of a host cell and/or on a virion.~~

~~29.—An antibody, or an antigen binding fragment thereof, comprising a heavy chain variable domain (VH) and a light chain variable domain (VL), wherein the VH comprises or consists of the amino acid sequence set forth in any one of SEQ ID NOs: 228, 740, 741, 742, and 743, and the VL comprises or consists of the amino acid sequence set forth in SEQ ID NO: 238,~~

~~wherein the antibody or antigen binding fragment is capable of binding to a surface glycoprotein of SARS-CoV-2 expressed on a cell surface of a host cell and/or on a virion.~~

~~30.—An antibody, or an antigen binding fragment thereof, comprising a heavy chain variable domain (VH) and a light chain variable domain (VL), wherein the VH comprises or consists of the amino acid sequence as set forth in SEQ ID NO: 32 and the VL comprises or consists of the amino acid sequence as set forth in SEQ ID NO: 36.~~

~~31.—An antibody, or an antigen binding fragment thereof, comprising a heavy chain variable domain (VH) comprising a CDRH1, a CDRH2, and a CDRH3, and a light chain variable domain (VL) comprising a CDRL1, a CDRL2, and a CDRL3, wherein the CDRH1, CDRH2, and CDRH3 comprise or consist of the amino acid sequences set forth in SEQ ID NOs: 33-35, respectively, and the CDRL1, CDRL2, and~~

~~CDRL3 comprise or consist of the amino acid sequences set forth in SEQ ID NOs: 37-39, respectively.~~

5. The antibody or antigen-binding fragment of claim 4, wherein the VH and VL comprise or consist of the amino acid sequences set forth in SEQ ID NOs.:

(i) 642 and 686, respectively; or

(ii) 630 and 686, respectively.

326. The antibody or antigen-binding fragment of any one of claims ~~3-34~~1-5, which is capable of neutralizing a SARS-CoV-2 infection in an *in vitro* model of infection and/or in an *in vivo* animal model of infection and/or in a human.

~~33. The antibody or antigen-binding fragment of any one of claims 1-32, which:~~

~~(i) recognizes an epitope in the ACE2 receptor binding motif (RBM, SEQ ID NO.:5) of SARS-CoV-2;~~

~~(ii) is capable of blocking an interaction between SARS-CoV-2 (e.g., SARS-CoV-2 RBM) and human ACE2;~~

~~(iii) is capable of binding to SARS-CoV-2S protein;~~

~~(iv) recognizes an epitope that is conserved in the ACE2 RBM of SARS-CoV-2 and in an ACE2 RBM of SARS-CoV-1;~~

~~(v) is cross reactive against SARS-CoV-2 and SARS-CoV-1 coronavirus;~~

~~(vii) recognizes an epitope in the SARS-CoV-2 surface glycoprotein that is not in the ACE2 RBM;~~

~~(viii) is capable of binding to a SARS-CoV-2 S protein trimer in a prefusion conformation;~~

~~or~~

~~(ix) any combination of (i)-(viii).~~

~~347.~~ The antibody or antigen-binding fragment of any one of claims 1-~~336~~, which is an IgG, IgA, IgM, IgE, or IgD isotype, and is preferably

~~35.~~ ~~The antibody or antigen-binding fragment of any one of claims 1-34,~~
~~which is an IgG isotype selected from IgG1, IgG2, IgG3, and IgG4,~~ and is more
preferably an IgG1 isotype.

~~368.~~ The antibody or antigen-binding fragment of any one of claims 1-~~357~~,
(1) which is human, humanized, or chimeric, and/or

~~37.~~ ~~The antibody or antigen-binding fragment of any one of claims 1-36;~~(2)
wherein the antibody, or the antigen-binding fragment, comprises a human antibody, a
monoclonal antibody, a purified antibody, a single chain antibody, a Fab, a Fab', a
F(ab')₂, a Fv, a scFv, or a scFab, and/or

~~38.~~ ~~The antibody or antigen-binding fragment of claim 37, wherein the scFv~~
~~comprises more than one VH domain and more than one VL domain.~~

~~39.~~ ~~The antibody or antigen-binding fragment of any one of claims 1-38;~~(3)
wherein the antibody or antigen-binding fragment is a multi-specific antibody or
antigen binding fragment, wherein optionally,

~~40.~~ ~~The antibody or antigen-binding fragment of claim 39, wherein the~~
antibody or antigen binding fragment is a bispecific antibody or antigen-binding
fragment.

~~41.~~ ~~The antibody or antigen-binding fragment of claim 39 or 40, comprising:~~

~~(i) a first VH and a first VL; and~~

~~(ii) a second VH and a second VL;~~

~~wherein the first VH and the second VH are different and each independently comprise an amino acid sequence having at least 85% (e.g., 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98%, 99%, or 100%) identity to the amino acid sequence set forth in any one of SEQ ID NOs.: 22, 32, 42, 52, 62, 72, 74, 84, 96, 106, 119, 129, 139, 150, 163, 173, 175, 178, 186, 189, 191, 198, 208, 218, 228, 240, 254, 264, 274, 284, 298, 312, 322, 332, 350, 351, 353, 359, 361, 363, 365, 367, 368, 369, 379, 389, 399, 409, 419, 429, 434, 444, 454, 464, 474, 484, 494, 504, 514, 524, 534, 544, 554, 564, 574, 584, 594, 604, 614, 624, 626, 628, 630, 634, 636, 638, 640, 642, 644, 646, 648, 650, 652, 654, 656, 658, 660, 662, 664, 666, 668, 670, 672, 674, 676, 678, 680, 682, 684, 692, 740, 741, 742, 743, 748, 749, 750, 752, 754, 756, 758, 759, 761, 762, and 764, and~~

~~wherein the first VL and the second VL are different and each independently comprise an amino acid sequence having at least 85% (e.g., 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98%, 99%, or 100%) identity to the amino acid sequence set forth in any one of SEQ ID NOs.: 26, 36, 46, 56, 66, 78, 88, 94, 100, 110, 123, 133, 143, 154, 157, 168, 194, 196, 202, 212, 222, 232, 238, 244, 250, 252, 258, 268, 278, 288, 294, 296, 302, 308, 310, 316, 326, 336, 355, 357, 373, 383, 393, 403, 413, 423, 438, 448, 458, 468, 478, 488, 498, 508, 518, 528, 538, 548, 558, 568, 578, 588, 598, 608, 618, 686, 696, 738, 744, and 746;~~

~~and wherein the first VH and the first VL together form a first antigen binding site, and wherein the second VH and the second VL together form a second antigen binding site.~~

42.——The antibody or antigen binding fragment of claim 40 or 41, comprising:

- (i)——a first VH and a first VL; and
- (ii)——a second VH and a second VL,

~~wherein the first VH comprises an amino acid sequence having at least 85% (e.g., 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98%, 99%, or 100%) identity to the amino acid sequence set forth in any one of SEQ ID NOs.: 139 and 342 and the first VL comprises an amino acid sequence having at least~~

~~85% (i.e., 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98%, 99%, or 100%) identity to the amino acid sequence set forth in any one of SEQ ID NOs.:143 and 346 and wherein the second VH comprises an amino acid sequence having at least 85% (e.g., 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98%, 99%, or 100%) identity to the amino acid sequence set forth in any one of SEQ ID NOs.: 399, 748, 749, 750, 752, 754, 756, 758, 759, and 761 and the second VL comprises an amino acid sequence having at least 85% (i.e., 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98%, 99%, or 100%) identity to the amino acid sequence set forth in any one of SEQ ID NOs.:403, 744, and 746.~~

~~43.—The antibody or antigen binding fragment of claim 39 or 40, comprising a first antigen binding portion having a first specificity and a second antigen binding portion having a second specificity, wherein the first antigen binding portion comprises a VH that comprises or consists of the amino acid sequence set forth in SEQ ID NO:399 and a VL that comprises or consists of the amino acid sequence set forth in SEQ ID NO.:738 or SEQ ID NO.:403.~~

~~44.—The antibody or antigen binding fragment of claim 43, wherein the second antigen binding portion comprises a VH that comprises or consists of the amino acid sequence set forth in SEQ ID NO.:139 and a VL that comprises or consists of the amino acid sequence set forth in SEQ ID NO.:143.~~

~~45.—The antibody or antigen binding fragment of claim 43, wherein the second antigen binding portion comprises a VH that comprises or consists of the amino acid sequence set forth in SEQ ID NO.:342 and a VL that comprises or consists of the amino acid sequence set forth in SEQ ID NO.:346.~~

~~469.~~ The antibody or antigen-binding fragment of any one of claims 1-~~458~~, wherein the antibody or antigen-binding fragment further comprises a Fc polypeptide or a fragment thereof; wherein, optionally,

~~47.~~ ~~The antibody or antigen-binding fragment of claim 46, wherein~~ the Fc polypeptide or fragment thereof comprises:

- (i) a mutation that enhances binding to a FcRn as compared to a reference Fc polypeptide that does not comprise the mutation; and/or
- (ii) a mutation that enhances binding to a FcγR as compared to a reference Fc polypeptide that does not comprise the mutation; wherein, further optionally,

~~48.~~ ~~The antibody or antigen-binding fragment of claim 47, wherein~~(1) the mutation that enhances binding to a FcRn comprises: M428L; N434S; N434H; N434A; N434S; M252Y; S254T; T256E; T250Q; P257I; Q311I; D376V; T307A; E380A; or any combination thereof; wherein, even further optionally,

~~49.~~ ~~The antibody or antigen-binding fragment of claim 47 or 48, wherein~~ the mutation that enhances binding to FcRn comprises:

- (i) M428L/N434S;
- (ii) M252Y/S254T/T256E;
- (iii) T250Q/M428L;
- (iv) P257I/Q311I;
- (v) P257I/N434H;
- (vi) D376V/N434H;
- (vii) T307A/E380A/N434A; or
- (viii) any combination of (i)-(vii); and/or

~~50.~~ ~~The antibody or antigen-binding fragment of any one of claims 47-49, wherein the mutation that enhances binding to FcRn comprises M428L/N434S.~~

~~51. The antibody or antigen binding fragment of any one of claims 47-50, wherein(2) the mutation that enhances binding to a FcγR comprises S239D; I332E; A330L; G236A; or any combination thereof; wherein, further optionally,~~

~~52. The antibody or antigen binding fragment of any one of claims 47-51, wherein~~ the mutation that enhances binding to a FcγR comprises:

- (i) S239D/I332E;
- (ii) S239D/A330L/I332E;
- (iii) G236A/S239D/I332E; or
- (iv) G236A/A330L/I332E.

~~53. The antibody or antigen binding fragment of any one of claims 47-52, wherein the Fc polypeptide comprises a L234A mutation and a L235A mutation.~~

~~54. The antibody or antigen binding fragment of any one of claims 1-53, which comprises a mutation that alters glycosylation, wherein the mutation that alters glycosylation comprises N297A, N297Q, or N297G, and/or which is aglycosylated and/or afucosylated.~~

~~55. The antibody or antigen binding fragment of any one of claims 1-54, which is capable of binding to a SARS-CoV-2 surface glycoprotein with an EC₅₀ of less than 500 ng/ml, less than 250 ng/ml, less than 100 ng/ml, less than 90 ng/ml, less than 80 ng/ml, less than 70 ng/ml, less than 60 ng/ml, less than 50 ng/ml, less than 40 ng/ml, less than 30 ng/ml, less than 25 ng/ml, less than 20 ng/ml, less than 16 ng/ml, less than 15 ng/ml, less than 14 ng/ml, less than 13 ng/ml, less than 12 ng/ml, less than 10 ng/ml, less than 9 ng/ml, less than 8 ng/ml, less than 7 ng/ml, less than 6 ng/ml, less than 5 ng/ml, less than 4 ng/ml, or less than 2 mg/ml, as measured by ELISA (optionally, indirect ELISA and/or sandwich ELISA) and/or by flow cytometry; wherein the SARS-CoV-2 surface glycoprotein is expressed at a cell surface of a host cell.~~

~~56.—The antibody or antigen binding fragment of any one of claims 1-55, which is capable of binding to a SARS-CoV-2 surface glycoprotein RBD with an EC50 of less than 500 ng/ml, less than 250 ng/ml, less than 100 ng/ml, less than 90 ng/ml, less than 80 ng/ml, less than 70 ng/ml, less than 60 ng/ml, less than 50 ng/ml, less than 40 ng/ml, less than 30 ng/ml, less than 25 ng/ml, less than 20 ng/ml, less than 16 ng/ml, less than 15 ng/ml, less than 14 ng/ml, less than 13 ng/ml, less than 12 ng/ml, less than 10 ng/ml, less than 9 ng/ml, less than 8 ng/ml, less than 7 ng/ml, less than 6 ng/ml, less than 5 ng/ml, less than 4 ng/ml, or less than 2 mg/ml, as measured by ELISA (optionally, indirect ELISA and/or sandwich ELISA) and/or by flow cytometry, wherein the SARS-CoV-2 surface glycoprotein is expressed at a cell surface of a host cell.~~

~~57.—The antibody or antigen binding fragment of any one of claims 1-56, which is capable of binding to a SARS-CoV-2 RBD with a KD of less than 5×10^{-8} M, less than 4×10^{-8} M, less than 3×10^{-8} M, less than 2×10^{-8} M, less than 1×10^{-8} M, less than 5×10^{-9} M, less than 1×10^{-9} M, less than 5×10^{-10} M, less than 1×10^{-10} M, less than 5×10^{-11} M, less than 1×10^{-11} M, less than 5×10^{-12} M, or less than 1×10^{-12} M, as determined using biolayer interferometry (BLI), optionally using an Octet instrument with antibody or antigen binding fragment loaded on Protein A pins, optionally at 2.7 μ g/ml, and SARS-CoV-2 RBD loaded for 5 minutes at 6 μ g/ml, 1.5 μ g/ml, or 0.4 μ g/ml, further optionally with dissociation measured for 7 minutes.~~

~~58.—The antibody or antigen binding fragment of any one of claims 1-57, which is capable of binding to a SARS-CoV-2 RBD with a KD of less than 6×10^{-8} M, less than 5×10^{-8} M, less than 4×10^{-8} M, less than 3×10^{-8} M, less than 2×10^{-8} M, less than 1×10^{-8} M, less than 5×10^{-9} M, less than 4×10^{-9} M, less than 3×10^{-9} M, less than 2×10^{-9} M, less than 1×10^{-9} M, or less than 8×10^{-10} M, as determined using surface plasmon resonance (SPR), optionally using a Biacore T200 instrument using a single cycle kinetics approach.~~

~~59. —The antibody or antigen-binding fragment of any one of claims 1-58, which is capable of binding to a SARS-CoV-2 RBD and inhibiting an interaction between (i) the RBD and (ii) a human ACE2 and/or a human SIGLEC-1.~~

~~60. —The antibody or antigen-binding fragment of any one of claims 1-59, which is capable of neutralizing:~~

~~(i) —infection by a SARS-CoV-2 pseudovirus, optionally:~~

~~(i)(a) —with a neutralization IC₅₀ of less than 100 ng/ml, less than 90 ng/ml, less than 80 ng/ml, less than 70 ng/ml, less than 60 ng/ml, less than 50 ng/ml, less than 40 ng/ml, less than 30 ng/ml, less than 25 ng/ml, less than 20 ng/ml, less than 15 ng/ml, less than 10 ng/ml, less than 9 ng/ml, less than 8 ng/ml, less than 7 ng/ml, less than 6 ng/ml, less than 5 ng/ml, less than 4 ng/ml, less than 3 ng/ml, less than 2 ng/ml, or less than 1 ng/ml, preferably less than 10 ng/ml, less than 9 ng/ml, less than 8 ng/ml, less than 7 ng/ml, less than 6 ng/ml, less than 5 ng/ml, less than 4 ng/ml, less than 3 ng/ml, less than 2 ng/ml, or less than 1 ng/ml, and/or~~

~~(i)(b) —with a neutralization IC₈₀ of less than 100 ng/ml, less than 90 ng/ml, less than 80 ng/ml, less than 70 ng/ml, less than 60 ng/ml, less than 50 ng/ml, less than 40 ng/ml, less than 30 ng/ml, or less than 25 ng/ml, preferably less than 50 ng/ml, less than 40 ng/ml, less than 30 ng/ml, or less than 25 ng/ml, and/or~~

~~(i)(c) with a neutralization EC₉₀ of less than 300 ng/ml, less than 200 ng/ml, less than 100 ng/ml, less than 90 ng/ml, less than 80 ng/ml, less than 70 ng/ml, less than 60 ng/ml, less than 50 ng/ml, less than 40 ng/ml, less than 30 ng/ml, less than 25 ng/ml, less than 20 ng/ml, less than 15 ng/ml, or less than 10 ng/ml, wherein, further optionally, the SARS-CoV-2 pseudovirus comprises a VSV pseudovirus and/or a MLV pseudovirus, and/or~~

~~(i)(d) —the SARS-CoV-2 pseudovirus comprises a VSV pseudovirus and/or a MLV pseudovirus; and/or~~

~~(ii) —infection by live SARS-CoV-2, optionally~~

~~(ii)(a) with a EC50 of less than 60 ng/ml, less than 50 ng/ml, less than 40 ng/ml, less than 30 ng/ml, less than 25 ng/ml, less than 20 ng/ml, less than 15 ng/ml, less than 12 ng/ml, less than 11 ng/ml, less than 10 ng/ml, less than 9 ng/ml, less than 8 ng/ml, less than 7 ng/ml, less 6 ng/ml, less than 5/ng ml, or less than 4 ng/ml, preferably less than 15 ng/ml, less than 12 ng/ml, less than 11 ng/ml, less than 10 ng/ml, less than 9 ng/ml, less than 8 ng/ml, less than 7 ng/ml, less 6 ng/ml, less than 5/ng ml, or less than 4 ng/ml, and/or~~

~~(ii)(b) with a EC90 of less than 50 ng/ml, less than 40 ng/ml, less than 35 ng/ml, less than 30 ng/ml, less than 25 ng/ml, less than 20 ng/ml, less than 15 ng/ml, less than 12 ng/ml, less than 11 ng/ml, less than 10 ng/ml, less than 9 ng/ml, less than 8 ng/ml, less than 7 ng/ml, less 6 ng/ml, less than 5/ng ml, or less than 4 ng/ml, preferably less than 30 ng/ml, less than 25 ng/ml, less than 20 ng/ml, less than 15 ng/ml, or less than 12 ng/ml, and/or~~

~~(ii)(c) over a 6 hour period, with a multiplicity of infection of 0.1; and/or~~

~~(iii) —infection by live SARS-CoV-2 in a host cell (e.g. a HEK293T cell) that expresses, optionally is engineered to overexpress, DC-SIGN, L-SIGN, SIGLEC, or ACE2; and/or~~

~~(iv) —infection by live SARS-CoV-2 in a host cell (e.g. a HEK293T cell) that expresses, optionally is engineered to overexpress, SIGLEC-1 or ACE2, wherein neutralizing infection comprises fully neutralizing infection.~~

~~61. —The antibody or antigen-binding fragment of any one of claims 1-60, which is capable of neutralizing infection by a SARS-CoV-2 variant that comprises any one of the following mutations in the surface glycoprotein as compared to a SARS-CoV-2 surface glycoprotein comprising SEQ ID NO.:3: N501Y; S477N; N439K; L452R; E484K; K417N; T478K; S494P; A520S; N501T; A522S; Y453F; P384L.~~

~~62. —The antibody or antigen-binding fragment of claim 61, which is capable of neutralizing infection by the SARS-CoV-2 variant with a potency that is less than 3-fold lower than the potency with which the antibody or antigen-binding fragment~~

neutralizes infection by a SARS-CoV-2 comprising the surface glycoprotein amino acid sequence set forth in SEQ ID NO.:3.

~~63. The antibody or antigen-binding fragment of any one of claims 1-62, which is capable of activating a FcγRIIa, a FcγRIIIa, or both, wherein, optionally: (i) the FcγRIIa comprises a H131 allele; and/or (ii) the FcγRIIIa comprises a V158 allele; and/or (iii) activation is determined using a SARS-CoV-2 S-expressing target cell, such as a CHO cell, and a reporter cell expressing a NFAT-driven reporter, such as luciferase.~~

~~64~~10. The antibody or antigen-binding fragment of any one of claims 1-~~63~~9, comprising:

- (a) the CH1-CH3 amino acid sequence set forth in SEQ ID NO.:6 and the CL amino acid sequence set forth in SEQ ID NO.:8;
- (b) The CH1-CH3 amino acid sequence set forth in SEQ ID NO.:6 and the CL amino acid sequence set forth in SEQ ID NO.:9;
- (c) the CH1-CH3 amino acid sequence set forth in SEQ ID NO.:7 and the CL amino acid sequence set forth in SEQ ID NO.:8; or
- (d) The CH1-CH3 amino acid sequence set forth in SEQ ID NO.:7 and the CL amino acid sequence set forth in SEQ ID NO.:9.

~~65. An isolated antibody comprising:~~

- ~~(i) the heavy chain amino acid sequence set forth in SEQ ID NO.:767; and~~
- ~~(ii) the light chain amino acid sequence set forth in SEQ ID NO.:768.~~

~~66. The antibody or antigen-binding fragment of any one of claims 1-65, which has an *in vivo* half life in a non-human primate of between 20 and 30 days, or between 22 and 28 days, or between 23 and 27 days, or between 24 and 26 days, or of about 25 days.~~

~~67.—The antibody or antigen binding fragment of any one of claims 1–66, wherein the antibody or antigen binding fragment is capable of neutralizing a SARS-CoV-2 infection and/or of neutralizing an infection of a target cell with an IC50 of about 20 to about 30 ng/ml.~~

~~68.—The antibody or antigen binding fragment of any one of claims 1–66, wherein the antibody or antigen binding fragment is capable of neutralizing a SARS-CoV-2 infection and/or of neutralizing an infection of a target cell with an IC50 of about 10 to about 20 ng/ml.~~

~~69.—The antibody or antigen binding fragment of any one of claims 1–66, wherein the antibody or antigen binding fragment is capable of neutralizing a SARS-CoV-2 infection and/or of neutralizing an infection of a target cell with an IC50 of about 5 to about 10 ng/ml.~~

~~70.—The antibody or antigen binding fragment of any one of claims 1–66, wherein the antibody or antigen binding fragment is capable of neutralizing a SARS-CoV-2 infection and/or of neutralizing an infection of a target cell with an IC50 of about 1 to about 5 ng/ml.~~

~~71.—The antibody or antigen binding fragment of any one of claims 1–70, wherein the antibody or antigen binding fragment is capable of neutralizing infection by SARS-CoV-2 and does not compete with a human ACE2 for binding to the SARS-CoV-2S protein,~~

~~wherein, optionally, the neutralizing comprises neutralizing infection in an in vitro model of infection.~~

~~72.—An antibody, or an antigen binding fragment thereof, that competes for binding to a SARS-CoV-2 surface glycoprotein with the antibody or antigen binding fragment of any one of claims 1–71.~~

~~73~~11. An isolated polynucleotide encoding the antibody or antigen-binding fragment of any one of claims 1-~~72~~10, or encoding a VH, a heavy chain, a VL, and/or a light chain of the antibody or the antigen-binding fragment, wherein, optionally,

~~74.~~ ~~The polynucleotide of claim 73, wherein~~ the polynucleotide comprises deoxyribonucleic acid (DNA) or ribonucleic acid (RNA), wherein the RNA further optionally comprises messenger RNA (mRNA).

~~75.~~ ~~The polynucleotide of claim 73 or 74, which is codon-optimized for expression in a host cell.~~

~~76.~~ ~~The polynucleotide of any one of claims 73-75, comprising a polynucleotide having at least 50%, at least 55%, at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 97%, or at least 99% identity to, or comprises or consists of, the polynucleotide sequence according to any one or more of SEQ ID NOs.: 30, 31, 40, 41, 50, 51, 60, 61, 70, 71, 73, 82, 83, 92, 93, 95, 104, 105, 114, 115, 116, 117, 118, 127, 128, 137, 138, 206, 207, 216, 217, 226, 227, 236, 237, 239, 248, 249, 251, 253, 262, 263, 272, 273, 282, 283, 292, 293, 295, 297, 306, 307, 309, 311, 320, 321, 330, 331, 340, 341, 377, 378, 387, 388, 397, 398, 407, 408, 417, 418, 427, 428, 433, 442, 443, 452, 453, 462, 463, 472, 473, 482, 483, 492, 493, 502, 503, 512, 513, 552, 523, 532, 533, 542, 543, 552, 553, 562, 563, 572, 573, 582, 583, 592, 593, 602, 603, 612, 613, 622, 623, 690, 691, 700-737 and 739.~~

~~77.~~ ~~The polynucleotide of any one of claims 73-76, comprising:~~

~~(i) a polynucleotide having at least 50%, at least 55%, at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 97%, or at least 99% identity to, or that comprises or consists of, the nucleotide sequence set forth in SEQ ID NO.:407; and~~

~~(ii) a polynucleotide having at least 50%, at least 55%, at least 60%, at least 65%, at least 70%, at least 75%, at least 80%, at least 85%, at least 90%, at least 95%, at least 97%, or at least 99% identity to, or that comprises or consists of, the nucleotide sequence set forth in SEQ ID NO.:408, 737, or 739.~~

7812. A recombinant vector comprising the polynucleotide of ~~any one of claims 73-77~~claim 11.

7913. A host cell comprising the polynucleotide of ~~any one of claims 77~~claim 11 and/or the vector of claim 7812, wherein the polynucleotide is heterologous to the host cell.

~~80. A human B cell comprising the polynucleotide of any one of claims 73-77, wherein polynucleotide is heterologous to the human B cell and/or wherein the human B cell is immortalized.~~

~~81~~14. A composition comprising:

- (i) the antibody or antigen-binding fragment of any one of claims 1-~~72~~10;
- (ii) the polynucleotide of ~~any one of claims 73-77~~claim 11;
- (iii) the recombinant vector of claim 7812; and/or
- (iv) the host cell of claim 7913; ~~and/or~~
- ~~(v) the human B cell of claim 80,~~

and a pharmaceutically acceptable excipient, carrier, or diluent.

~~82. The composition of claim 81, comprising two or more antibodies or antigen-binding fragments of any of claims 1-72.~~

~~83. The composition of claim 82, comprising:~~

~~(i) a first antibody or antigen binding fragment, comprising a VH comprising or consisting of the amino acid sequence as set forth in SEQ ID NO: 32 and a VL comprising or consisting of the amino acid sequence as set forth in SEQ ID NO: 36; and~~
~~(ii) a second antibody or antigen binding fragment comprising, a VH comprising or consisting of the amino acid sequence as set forth in SEQ ID NO: 139 and a VL comprising or consisting of the amino acid sequence as set forth in SEQ ID NO: 143.~~

~~84. —The composition of claim 82, comprising:~~

~~(i) a first antibody or antigen binding fragment comprising a heavy chain variable domain (VH) comprising a CDRH1, a CDRH2, and a CDRH3, and a light chain variable domain (VL) comprising a CDRL1, a CDRL2, and a CDRL3, wherein the CDRH1, CDRH2, and CDRH3 comprise or consist of the amino acid sequences set forth in SEQ ID NOs: 33-35, respectively, and the CDRL1, CDRL2, and CDRL3 comprise or consist of the amino acid sequences set forth in SEQ ID NOs: 37-39, respectively; and~~

~~(ii) a second antibody or antigen binding fragment comprising a heavy chain variable domain (VH) comprising a CDRH1, a CDRH2, and a CDRH3, and a light chain variable domain (VL) comprising a CDRL1, a CDRL2, and a CDRL3, wherein the CDRH1, CDRH2, and CDRH3 comprise or consist of the amino acid sequences set forth in SEQ ID NOs: 140-142, respectively, and the CDRL1, CDRL2, and CDRL3 comprise or consist of the amino acid sequences set forth in SEQ ID NOs: 144-146, respectively.~~

~~85. —The composition of claim 82, comprising:~~

~~(i) a first antibody or antigen binding fragment, comprising a VH comprising or consisting of the amino acid sequence as set forth in SEQ ID NO: 139 or 342 and a VL comprising or consisting of the amino acid sequence as set forth in SEQ ID NO: 143 or 346; and~~

~~(ii) a second antibody or antigen binding fragment comprising a VH comprising or consisting of the amino acid sequence as set forth in SEQ ID NO: 399, 748, 749, 750, 752, 754, 756, 758, 759, or 761, and a VL comprising or consisting of the amino acid sequence as set forth in SEQ ID NO: 403, 744, or 746.~~

~~86. The composition of claim 82, comprising:~~

~~(i) a first antibody or antigen binding fragment comprising a heavy chain variable domain (VH) comprising a CDRH1, a CDRH2, and a CDRH3, and a light chain variable domain (VL) comprising a CDRL1, a CDRL2, and a CDRL3, wherein the CDRH1, CDRH2, and CDRH3 comprise or consist of the amino acid sequences set forth in SEQ ID NOs: 140-142, respectively, or 343-345, respectively, and the CDRL1, CDRL2, and CDRL3 comprise or consist of the amino acid sequences set forth in SEQ ID NOs: 144-146, respectively; and~~

~~(ii) a second antibody or antigen binding fragment comprising a heavy chain variable domain (VH) comprising a CDRH1, a CDRH2, and a CDRH3, and a light chain variable domain (VL) comprising a CDRL1, a CDRL2, and a CDRL3, wherein the CDRH1, CDRH2, and CDRH3 comprise or consist of the amino acid sequences set forth in SEQ ID NOs: 400, 401, and any one of 751, 753, 755, 757, 760, respectively, and the CDRL1, CDRL2, and CDRL3 comprise or consist of the amino acid sequences set forth in SEQ ID NOs: 404, 405, and any one of 406, 745, and 747, respectively.~~

~~87. A composition comprising:~~

~~(i) a first antibody or antigen binding fragment, comprising~~

~~(i)(a) a VH comprising or consisting of the amino acid sequence as set forth in SEQ ID NO: 32, and~~

~~(i)(b) a VL comprising or consisting of the amino acid sequence as set forth in SEQ ID NO: 36; and~~

~~(ii) a second antibody or antigen binding fragment comprising~~

~~(ii)(a) a VH comprising or consisting of the amino acid sequence as set forth in SEQ ID NO: 139 and~~

~~(ii)(b) a VL comprising of consisting of the amino acid sequence as set forth in SEQ ID NO: 143.~~

~~88. A composition comprising:~~

~~(i) a first antibody or antigen binding fragment that is capable of binding to a SARS-CoV-2 surface glycoprotein and comprises~~

~~(i)(a) a VH comprising the CDRH1, CDRH2, and CDRH3 amino acid sequences set forth in SEQ ID NOs.:400, 402, and 766, respectively, and~~

~~(i)(b) a VL comprising the CDRL1, CDRL2, and CDRL3 amino acid sequences set forth in SEQ ID NOs.:404, 405, and 406, respectively; and~~

~~(ii) a second antibody or antigen binding fragment that is capable of binding to a SARS-CoV-2 surface glycoprotein and comprises~~

~~(ii)(a) a VH comprising the CDRH1, CDRH2, and CDRH3 amino acid sequences set forth in SEQ ID NOs.:140, 141 or 343, and 142, respectively, and~~

~~(ii)(b) a VL comprising CDRL1, CDRL2, and CDRL3 amino acid sequences as set forth in SEQ ID NOs.:144, 145, and 146, respectively.~~

~~89. A composition comprising:~~

~~(i) a first antibody or antigen binding fragment that is capable of binding to a SARS-CoV-2 surface glycoprotein and comprises~~

~~(i)(a) a VH comprising the amino acid sequence set forth in SEQ ID NO.:399 and~~

~~(i)(b) a VL comprising the amino acid sequence set forth in SEQ ID NOs.:403 or SEQ ID NO.:738; and~~

~~(ii) a second antibody or antigen binding fragment that is capable of binding to a SARS-CoV-2 surface glycoprotein and comprises~~

(ii)(a) ~~a VH comprising the amino acid sequence set forth in SEQ ID NOs:139 or 342, and~~

(ii)(b) ~~a VL comprising the amino acid sequence set forth in SEQ ID NO:143.~~

90. ~~The composition of any one of claims 82-89, wherein the first antibody or antigen-binding fragment and the second antibody or antigen-binding fragment each comprise an IgG1-Fc polypeptide comprising a M428L-mutation and a N434S mutation.~~

91. ~~The composition of any one of claims 82-90, wherein the first antibody or antigen-binding fragment and the second antibody or antigen-binding fragment each comprise an IgG1-Fc polypeptide comprising a G236A-mutation, a A330L-mutation, and a I332E-mutation.~~

92. ~~A composition comprising the polynucleotide of any one of claims 73-77 encapsulated in a carrier molecule, wherein the carrier molecule optionally comprises a lipid, a lipid-derived delivery vehicle, such as a liposome, a solid lipid nanoparticle, an oily suspension, a submicron lipid emulsion, a lipid microbubble, an inverse lipid micelle, a cochlear liposome, a lipid microtubule, a lipid microcylinder, lipid nanoparticle (LNP), or a nanoscale platform.~~

93. ~~A composition comprising:~~

(i) ~~a first antibody or antigen-binding fragment that is capable of binding to a SARS-CoV-2 surface glycoprotein and inhibiting an interaction between the SARS-CoV-2 surface glycoprotein and a first cell surface receptor selected from ACE2, DC-SIGN, L-SIGN, and SIGLEC-1; and~~

(ii) ~~a second antibody or antigen-binding fragment that is capable of binding to a SARS-CoV-2 surface glycoprotein and inhibiting an interaction between the~~

~~SARS-CoV-2 surface glycoprotein and a second cell surface receptor selected from ACE2, DC-SIGN, L-SIGN, and SIGLEC-1,~~

~~wherein the first cell surface receptor and the second cell surface receptor are different.~~

~~94. A method of treating a coronavirus infection, e.g. a SARS-CoV-2 infection, in a subject, the method comprising administering to the subject an effective amount of:~~

- ~~(i) the antibody or antigen-binding fragment of any one of claims 1-72;~~
- ~~(ii) the polynucleotide of any one of claims 73-77;~~
- ~~(iii) the recombinant vector of claim 78;~~
- ~~(iv) the host cell of claim 79;~~
- ~~(v) the human B-cell of claim 80; and/or~~
- ~~(vi) the composition of any one of claims 81-93.~~

~~95. A method of treating a coronavirus infection, e.g. a SARS-CoV-2 infection, in a subject, the method comprising administering to the subject:~~

~~(i) a first antibody or antigen-binding fragment that is capable of binding to a SARS-CoV-2 surface glycoprotein and comprises~~

~~(i)(a) a VH comprising the CDRH1, CDRH2, and CDRH3 amino acid sequences set forth in SEQ ID NOs.:400, 402, and 766, respectively; and~~

~~(i)(b) a VL comprising the CDRL1, CDRL2, and CDRL3 amino acid sequences set forth in SEQ ID NOs.:404, 405, and 406, respectively; and~~

~~(ii) a second antibody or antigen-binding fragment that is capable of binding to a SARS-CoV-2 surface glycoprotein and comprises~~

~~(ii)(a) a VH comprising the CDRH1, CDRH2, and CDRH3 amino acid sequences set forth in SEQ ID NOs.:140, 141 or 343, and 142, respectively; and~~

~~(ii)(b) a VL comprising CDRL1, CDRL2, and CDRL3 amino acid sequences as set forth in SEQ ID NOs.:144, 145, and 146, respectively.~~

~~96. A method of treating a coronavirus infection, *e.g.* a SARS-CoV-2 infection, in a subject, the method comprising administering to the subject:~~

~~(i) a first antibody or antigen binding fragment that is capable of binding to a SARS-CoV-2 surface glycoprotein and comprises~~

~~(i)(a) a VH comprising the amino acid sequence set forth in SEQ ID NO.:399 and~~

~~(i)(b) a VL comprising the amino acid sequence set forth in SEQ ID NOs.:403 or SEQ ID NO.:738; and~~

~~(ii) a second antibody or antigen binding fragment that is capable of binding to a SARS-CoV-2 surface glycoprotein and comprises~~

~~(ii)(a) a VH comprising the amino acid sequence set forth in SEQ ID NOs.:139 or 342, and~~

~~(ii)(b) a VL comprising the amino acid sequence set forth in SEQ ID NO.:143.~~

~~97. A method of preventing or treating or neutralizing a coronavirus infection in a subject, the method comprising administering to a subject who has received a first antibody or antigen binding fragment comprising:~~

~~(i)(a) VH and VL amino acid sequences according to SEQ ID NOs.:32 and 36 respectively; or~~

~~(i)(b) CDRH1, CDRH2, CDRH3, CDRL1, CDRL2, and CDRL3 amino acid sequences according to SEQ ID NOS.:33-35 and 37-39, respectively;~~

~~a second antibody or antigen binding fragment comprising:~~

~~(ii)(a) a VH amino acid sequence according to SEQ ID NO.: 139, and a VL amino acid sequence according to SEQ ID NO.: 143; or~~

~~(ii)(b) CDRH1, CDRH2, and CDRH3 amino acids according to SEQ ID NOs: 140-142, respectively, and CDRL1, CDRL2, and CDRL3 amino acid sequences according to SEQ ID NOs: 144-146.~~

98. — A method of preventing or treating or neutralizing a coronavirus infection in a subject, the method comprising administering to a subject who has received a first antibody or antigen binding fragment comprising:

~~(i)(a) a VH amino acid sequence according to SEQ ID NO.: 139, and a VL amino acid sequence according to SEQ ID NO: 143; or~~

~~(i)(b) CDRH1, CDRH2, and CDRH3 amino acid sequences according to SEQ ID NOs: 140-142, respectively; and CDRL1, CDRL2, and CDRL3 amino acid sequences according to SEQ ID NOs: 144-146, respectively; a second antibody or antigen binding fragment comprising:~~

~~(ii)(a) VH and VL amino acid sequences according to SEQ ID NOs.:32 and 36 respectively; or~~

~~(ii)(b) CDRH1, CDRH2, CDRH3, CDRL1, CDRL2, and CDRL3 amino acid sequences according to SEQ ID NOS.:33-35 and 37-39, respectively.~~

— 99. — A method of preventing or treating or neutralizing a coronavirus infection in a subject, the method comprising administering to a subject who has received a first antibody or antigen binding fragment comprising:

— (i)(a) a VH amino acid sequence according to SEQ ID NO.: 139 or 342 and a VL amino acid sequence according to SEQ ID NO: 143 or 346; or

— (i)(b) CDRH1, CDRH2, and CDRH3 amino acid sequences according to SEQ ID NOs: 140-142, respectively, or 343-345, respectively and CDRL1, CDRL2, and CDRL3 amino acid sequences according to SEQ ID NOs: 144-146, respectively; a second antibody or antigen binding fragment comprising:

— (ii)(a) a VH amino acid sequence according to SEQ ID NO: 399, 748, 749, 750, 752, 754, 756, 758, 759, or 761 and a VL amino acid sequence according to SEQ ID NO: 403, 744, or 746; or

~~——(ii)(b) CDRH1, CDRH2, and CDRH3 amino acid sequences according to SEQ ID NOs: 400, 401, and any one of 751, 753, 755, 757, 760, respectively and CDRL1, CDRL2, and CDRL3 amino acid sequences according to SEQ ID NOs: 404, 405, and any one of 406, 745, and 747, respectively.~~

~~——100. A method of preventing or treating or neutralizing a coronavirus infection in a subject, the method comprising administering to a subject who has received a first antibody or antigen binding fragment comprising:~~

~~——(i)(a) a VH amino acid sequence according to SEQ ID NO: 399, 748, 749, 750, 752, 754, 756, 758, 759, or 761 and a VL amino acid sequence according to SEQ ID NO: 403, 744, or 746; or~~

~~——(i)(b) CDRH1, CDRH2, and CDRH3 amino acid sequences according to SEQ ID NOs: 400, 401, and any one of 751, 753, 755, 757, 760, respectively and CDRL1, CDRL2, and CDRL3 amino acid sequences according to SEQ ID NOs: 404, 405, and any one of 406, 745, and 747, respectively;~~

~~a second antibody or antigen binding fragment comprising:~~

~~——(ii)(a) a VH amino acid sequence according to SEQ ID NO.: 139 or 342 and a VL amino acid sequence according to SEQ ID NO: 143 or 346; or~~

~~——(ii)(b) CDRH1, CDRH2, and CDRH3 amino acid sequences according to SEQ ID NOs: 140-142, respectively, or 343-345, respectively and CDRL1, CDRL2, and CDRL3 amino acid sequences according to SEQ ID NOs: 144-146, respectively.~~

~~101. The method of any one of claims 95-100, wherein the first antibody or antigen binding fragment and the second antibody or antigen binding fragment each comprise an IgG1-Fc polypeptide comprising a M428L mutation and a N434S mutation.~~

~~102. The method of any one of claims 95-101, wherein the first antibody or antigen binding fragment and the second antibody or antigen binding fragment each~~

comprise an IgG1-Fc polypeptide comprising a G236A mutation, a A330L mutation, and a I332E mutation.

~~103.—A method of treating a SARS-CoV-2 infection in a subject, the method comprising administering to the subject:~~

~~(i)—a first antibody or antigen-binding fragment that is capable of binding to a SARS-CoV-2 surface glycoprotein and inhibiting an interaction between the SARS-CoV-2 surface glycoprotein and a first cell surface receptor selected from ACE2, DC-SIGN, L-SIGN, and SIGLEC-1; and~~

~~(ii)—a second antibody or antigen-binding fragment that is capable of binding to a SARS-CoV-2 surface glycoprotein and inhibiting an interaction between the SARS-CoV-2 surface glycoprotein and a second cell surface receptor selected from ACE2, DC-SIGN, L-SIGN, and SIGLEC-1,~~

~~wherein the first cell surface receptor and the second cell surface receptor are different.~~

~~10415. The antibody or antigen-binding fragment of any one of claims 1-7210, the polynucleotide of ~~any one of claims 73-77~~claim 11, the recombinant vector of claim 7812, the host cell of claim 7913, the human B-cell of claim 80, and/or the composition of any one of claims 81-93claim 14 for use in a method of treating a SARS-CoV-2 infection in a subjectas a medicament.~~

~~105.—The antibody or antigen-binding fragment of any one of claims 1-72, the polynucleotide of any one of claims 73-77, the recombinant vector of claim 78, the host cell of claim 79, the human B-cell of claim 80, and/or the composition of any one of claims 81-93 for use in the preparation of a medicament for the treatment of a SARS-CoV-2 infection in a subject.~~

~~106.—A method for *in vitro* diagnosis of a SARS-CoV-2 infection, the method comprising:~~

(i) ~~contacting a sample from a subject with an antibody or antigen-binding fragment of any one of claims 1-72; and~~

(ii) ~~detecting a complex comprising an antigen and the antibody, or comprising an antigen and the antigen-binding fragment.~~

~~107. The method of claim 106, wherein the sample comprises blood isolated from the subject.~~

16. Use of the antibody or antigen-binding fragment of any one of claims 1-10 in the manufacture of a medicament for treating a SARS-CoV-2 infection in a subject.

17. Use of the composition of claim 14 in the manufacture of a medicament for treating a SARS-CoV-2 infection in a subject.

18. An *in vitro* method for producing the antibody or antigen-binding fragment of any one of claims 1-10, wherein the method comprises culturing a host cell expressing the antibody or antigen-binding fragment under conditions and for a time sufficient to produce the antibody, or the antigen-binding fragment.

19. The *in vitro* method of claim 18, wherein the method comprises culturing the host cell in batch cell culture.

20. The *in vitro* method of claim 18 or 19, wherein the method further comprises purifying the antibody or antigen-binding fragment.