

CLAIMS

1. An antibody or antigen-binding fragment thereof, comprising:

- a) a heavy chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 1, SEQ ID NO: 2, and SEQ ID NO: 3; and a light chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 4, SEQ ID NO: 5, and SEQ ID NO: 6;
- b) a heavy chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 9, SEQ ID NO: 10, and SEQ ID NO: 11; and a light chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 12, SEQ ID NO: 13, and SEQ ID NO: 14;
- c) a heavy chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 17, SEQ ID NO: 18, and SEQ ID NO: 19; and a light chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 20, SEQ ID NO: 21 and SEQ ID NO: 22;
- d) a heavy chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 25, SEQ ID NO: 26, and SEQ ID NO: 27; and a light chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 28, SEQ ID NO: 29, and SEQ ID NO: 30;
- e) a heavy chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 33, SEQ ID NO: 34, and SEQ ID NO: 35; and a light chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 36, SEQ ID NO: 37, and SEQ ID NO: 38;
- f) a heavy chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 41, SEQ ID NO: 42, and SEQ ID NO: 43; and a light chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 44, SEQ ID NO: 45, and SEQ ID NO: 46;
- g) a heavy chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 49, SEQ ID NO: 50, and SEQ ID NO: 51; and a light chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 52, SEQ ID NO: 53, and SEQ ID NO: 54;
- h) a heavy chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 57, SEQ ID NO: 58, and SEQ ID NO: 59; and a light chain variable region

comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 60, SEQ ID NO: 61, and SEQ ID NO: 62;

- i) a heavy chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 65, SEQ ID NO: 66, and SEQ ID NO: 67; and a kappa light chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 68, SEQ ID NO: 69, and SEQ ID NO: 70;
- j) a heavy chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 73, SEQ ID NO: 74, and SEQ ID NO: 75; and a kappa light chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 76, SEQ ID NO: 77, and SEQ ID NO: 78;
- k) a heavy chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 81, SEQ ID NO: 82, and SEQ ID NO: 83; and a kappa light chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 84, SEQ ID NO: 85, and SEQ ID NO: 86;
- l) a heavy chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 89, SEQ ID NO: 90, and SEQ ID NO: 91; and a light chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 92, SEQ ID NO: 93, and SEQ ID NO: 94;
- m) a heavy chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 97, SEQ ID NO: 98, and SEQ ID NO: 99; and a light chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 100, SEQ ID NO: 101, and SEQ ID NO: 102;
- n) a heavy chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 105, SEQ ID NO: 106, and SEQ ID NO: 107; and a light chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 108, SEQ ID NO: 109 and SEQ ID NO: 110;
- o) a heavy chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 113, SEQ ID NO: 114, and SEQ ID NO: 115; and a light chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 116, SEQ ID NO: 117, and SEQ ID NO: 118;
- p) a heavy chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 121, SEQ ID NO: 122, and SEQ ID NO: 123; and a light chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 124, SEQ ID NO: 125, and SEQ ID NO: 126;

- q) a heavy chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO:129, SEQ ID NO: 130, and SEQ ID NO: 131; and a light chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 132, SEQ ID NO: 133, and SEQ ID NO:134;
- r) a heavy chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO:137, SEQ ID NO: 138, and SEQ ID NO: 139; and a light chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 140, SEQ ID NO: 141, and SEQ ID NO: 142;
- s) a heavy chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 145, SEQ ID NO: 146, and SEQ ID NO: 147; and a light chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 148, SEQ ID NO: 149, and SEQ ID NO: 150;
- t) a heavy chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 153, SEQ ID NO: 154, and SEQ ID NO: 155; and a kappa light chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 156, SEQ ID NO: 157, and SEQ ID NO: 158;
- u) a heavy chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 161, SEQ ID NO: 162, and SEQ ID NO: 163; and a kappa light chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 164, SEQ ID NO: 165, and SEQ ID NO: 166;
- v) a heavy chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 169, SEQ ID NO: 170, and SEQ ID NO: 171; and a kappa light chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 172, SEQ ID NO: 173, and SEQ ID NO: 174;
- w) a heavy chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 177, SEQ ID NO: 178, and SEQ ID NO: 179; and a light chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 180, SEQ ID NO: 181, and SEQ ID NO: 182;
- x) a heavy chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 185, SEQ ID NO: 186, and SEQ ID NO: 187; and a light chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 188, SEQ ID NO: 189, and SEQ ID NO: 190;
- y) a heavy chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 193, SEQ ID NO: 194, and SEQ ID NO: 195; and a light chain variable region

- comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 196, SEQ ID NO: 197 and SEQ ID NO: 198;
- z) a heavy chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 201, SEQ ID NO: 202, and SEQ ID NO: 203; and a light chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 204, SEQ ID NO: 205, and SEQ ID NO: 206;
 - aa) a heavy chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 209, SEQ ID NO: 210, and SEQ ID NO: 211; and a light chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 212, SEQ ID NO: 213, and SEQ ID NO: 214;
 - bb) a heavy chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 217, SEQ ID NO: 218, and SEQ ID NO: 219; and a light chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 220, SEQ ID NO: 221, and SEQ ID NO: 222;
 - cc) a heavy chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 225, SEQ ID NO: 226, and SEQ ID NO: 227; and a light chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 228, SEQ ID NO: 229, and SEQ ID NO: 230;
 - dd) a heavy chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 233, SEQ ID NO: 234, and SEQ ID NO: 235; and a light chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 236, SEQ ID NO: 237, and SEQ ID NO: 238;
 - ee) a heavy chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 241, SEQ ID NO: 242, and SEQ ID NO: 243; and a kappa light chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 244, SEQ ID NO: 245, and SEQ ID NO: 246;
 - ff) a heavy chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 249, SEQ ID NO: 250, and SEQ ID NO: 251; and a kappa light chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 252, SEQ ID NO: 253, and SEQ ID NO: 254;
 - gg) a heavy chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 257, SEQ ID NO: 258, and SEQ ID NO: 259; and a kappa light chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 260, SEQ ID NO: 261, and SEQ ID NO: 262;

- hh) a heavy chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 265, SEQ ID NO: 266, and SEQ ID NO: 267; and a light chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 268, SEQ ID NO: 269, and SEQ ID NO: 270;
- ii) a heavy chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 273, SEQ ID NO: 274, and SEQ ID NO: 275; and a light chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 276, SEQ ID NO: 277, and SEQ ID NO: 278;
- jj) a heavy chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 281, SEQ ID NO: 282, and SEQ ID NO: 283; and a light chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 284, SEQ ID NO: 285 and SEQ ID NO: 286;
- kk) a heavy chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 289, SEQ ID NO: 290, and SEQ ID NO: 291; and a light chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 292, SEQ ID NO: 293, and SEQ ID NO: 294;
- ll) a heavy chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 297, SEQ ID NO: 298, and SEQ ID NO: 299; and a light chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 300, SEQ ID NO: 301, and SEQ ID NO: 302;
- mm) a heavy chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 305, SEQ ID NO: 306, and SEQ ID NO: 307; and a light chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 308, SEQ ID NO: 309, and SEQ ID NO: 310;
- nn) a heavy chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 313, SEQ ID NO: 314, and SEQ ID NO: 315; and a light chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 316, SEQ ID NO: 317, and SEQ ID NO: 318;
- oo) a heavy chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 321, SEQ ID NO: 322, and SEQ ID NO: 323; and a light chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 324, SEQ ID NO: 325, and SEQ ID NO: 326;
- pp) a heavy chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 329, SEQ ID NO: 330, and SEQ ID NO: 331; and a kappa light chain variable

region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 332, SEQ ID NO: 333, and SEQ ID NO: 334;

- qq) a heavy chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 337, SEQ ID NO: 338, and SEQ ID NO: 339; and a kappa light chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 340, SEQ ID NO: 341, and SEQ ID NO: 342;
- rr) a heavy chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 9, SEQ ID NO: 374, and SEQ ID NO: 375; and a kappa light chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 376, SEQ ID NO: 13, and SEQ ID NO: 14; or
- ss) a heavy chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 41, SEQ ID NO: 42, and SEQ ID NO: 43; and a kappa light chain variable region comprising 1, 2, or 3 CDR sequences selected from SEQ ID NO: 377, SEQ ID NO: 45, and SEQ ID NO: 46.

2. The antibody or antigen-binding fragment thereof of claim 1, comprising a heavy chain variable region selected from the group consisting of: SEQ ID NO: 7, SEQ ID NO: 15, SEQ ID NO: 23, SEQ ID NO: 31, SEQ ID NO: 39, SEQ ID NO: 47, SEQ ID NO: 55, SEQ ID NO: 63, SEQ ID NO: 71, SEQ ID NO: 79, SEQ ID NO: 87, SEQ ID NO: 95, SEQ ID NO: 103, SEQ ID NO: 111, SEQ ID NO: 119, SEQ ID NO: 127, SEQ ID NO: 135, SEQ ID NO: 143, SEQ ID NO: 151, SEQ ID NO: 159, SEQ ID NO: 167, SEQ ID NO: 175, SEQ ID NO: 183, SEQ ID NO: 191, SEQ ID NO: 199, SEQ ID NO: 207, SEQ ID NO: 215, SEQ ID NO: 223, SEQ ID NO: 231, SEQ ID NO: 239, SEQ ID NO: 247, SEQ ID NO: 255, SEQ ID NO: 263, SEQ ID NO: 271, SEQ ID NO: 279, SEQ ID NO: 287, SEQ ID NO: 295, SEQ ID NO: 303, SEQ ID NO: 311, SEQ ID NO: 319, SEQ ID NO: 327, SEQ ID NO: 335, SEQ ID NO: 343, SEQ ID NO: 347, and SEQ ID NO: 349 and the homologue sequences of at least 80% sequence identity thereof.

3. The antibody or antigen-binding fragment thereof of claim 1, comprising a light chain variable region selected from the group consisting of: SEQ ID NO: 8, SEQ ID NO: 16, SEQ ID NO: 24, SEQ ID NO: 32, SEQ ID NO: 40, SEQ ID NO: 48, SEQ ID NO: 56, SEQ ID NO: 64, SEQ ID NO: 72, SEQ ID NO: 80, SEQ ID NO: 88, SEQ ID NO: 96, SEQ ID NO: 104, SEQ ID NO: 112, SEQ ID NO: 120, SEQ ID NO: 128, SEQ ID NO: 136, SEQ ID NO: 144, SEQ ID NO: 152, SEQ ID NO: 160, SEQ ID NO: 168, SEQ ID NO: 176, SEQ ID NO: 184,

SEQ ID NO: 192, SEQ ID NO: 200, SEQ ID NO: 208, SEQ ID NO: 216, SEQ ID NO: 224, SEQ ID NO: 232, SEQ ID NO: 240, SEQ ID NO: 248, SEQ ID NO: 256, SEQ ID NO: 264, SEQ ID NO: 272, SEQ ID NO: 280, SEQ ID NO: 288, SEQ ID NO: 296, SEQ ID NO: 304, SEQ ID NO: 312, SEQ ID NO: 320, SEQ ID NO: 328, SEQ ID NO: 336, SEQ ID NO: 344, SEQ ID NO: 348, and SEQ ID NO: 350 and the homologue sequences of at least 80% sequence identity thereof.

4. The antibody or antigen-binding fragment thereof of claim 1, comprising:

- a) a heavy chain variable region comprising SEQ ID NO: 7 and a light chain variable region comprising SEQ ID NO: 8;
- b) a heavy chain variable region comprising SEQ ID NO: 15 and a light chain variable region comprising SEQ ID NO: 16;
- c) a heavy chain variable region comprising SEQ ID NO: 23 and a light chain variable region comprising SEQ ID NO: 24;
- d) a heavy chain variable region comprising SEQ ID NO: 31 and a light chain variable region comprising SEQ ID NO: 32;
- e) a heavy chain variable region comprising SEQ ID NO: 39 and a light chain variable region comprising SEQ ID NO: 40;
- f) a heavy chain variable region comprising SEQ ID NO: 47 and a light chain variable region comprising SEQ ID NO: 48;
- g) a heavy chain variable region comprising SEQ ID NO: 55 and a light chain variable region comprising SEQ ID NO: 56;
- h) a heavy chain variable region comprising SEQ ID NO: 63 and a light chain variable region comprising SEQ ID NO: 64;
- i) a heavy chain variable region comprising SEQ ID NO: 71 and a light chain variable region comprising SEQ ID NO: 72;
- j) a heavy chain variable region comprising SEQ ID NO: 79 and a light chain variable region comprising SEQ ID NO: 80;
- k) a heavy chain variable region comprising SEQ ID NO: 87 and a light chain variable region comprising SEQ ID NO: 88;
- l) a heavy chain variable region comprising SEQ ID NO: 95 and a light chain variable region comprising SEQ ID NO: 96;
- m) a heavy chain variable region comprising SEQ ID NO: 103 and a light chain variable region comprising SEQ ID NO: 104;

- n) a heavy chain variable region comprising SEQ ID NO: 111 and a light chain variable region comprising SEQ ID NO: 112;
- o) a heavy chain variable region comprising SEQ ID NO: 119 and a light chain variable region comprising SEQ ID NO: 120;
- p) a heavy chain variable region comprising SEQ ID NO: 127 and a light chain variable region comprising SEQ ID NO: 128;
- q) a heavy chain variable region comprising SEQ ID NO: 135 and a light chain variable region comprising SEQ ID NO: 136;
- r) a heavy chain variable region comprising SEQ ID NO: 143 and a light chain variable region comprising SEQ ID NO: 144;
- s) a heavy chain variable region comprising SEQ ID NO: 151 and a light chain variable region comprising SEQ ID NO: 152;
- t) a heavy chain variable region comprising SEQ ID NO: 159 and a light chain variable region comprising SEQ ID NO: 160;
- u) a heavy chain variable region comprising SEQ ID NO: 167 and a light chain variable region comprising SEQ ID NO: 168;
- v) a heavy chain variable region comprising SEQ ID NO: 175 and a light chain variable region comprising SEQ ID NO: 176;
- w) a heavy chain variable region comprising SEQ ID NO: 183 and a light chain variable region comprising SEQ ID NO: 184;
- x) a heavy chain variable region comprising SEQ ID NO: 191 and a light chain variable region comprising SEQ ID NO: 192;
- y) a heavy chain variable region comprising SEQ ID NO: 199 and a light chain variable region comprising SEQ ID NO: 200;
- z) a heavy chain variable region comprising SEQ ID NO: 207 and a light chain variable region comprising SEQ ID NO: 208;
- aa) a heavy chain variable region comprising SEQ ID NO: 215 and a light chain variable region comprising SEQ ID NO: 216;
- bb) a heavy chain variable region comprising SEQ ID NO: 223 and a light chain variable region comprising SEQ ID NO: 224;
- cc) a heavy chain variable region comprising SEQ ID NO: 231 and a light chain variable region comprising SEQ ID NO: 232;
- dd) a heavy chain variable region comprising SEQ ID NO: 239 and a light chain variable region comprising SEQ ID NO: 240;

- ee) a heavy chain variable region comprising SEQ ID NO: 247 and a light chain variable region comprising SEQ ID NO: 248;
- ff) a heavy chain variable region comprising SEQ ID NO: 255 and a light chain variable region comprising SEQ ID NO: 256;
- gg) a heavy chain variable region comprising SEQ ID NO: 263 and a light chain variable region comprising SEQ ID NO: 264;
- hh) a heavy chain variable region comprising SEQ ID NO: 271 and a light chain variable region comprising SEQ ID NO: 272;
- ii) a heavy chain variable region comprising SEQ ID NO: 279 and a light chain variable region comprising SEQ ID NO: 280;
- jj) a heavy chain variable region comprising SEQ ID NO: 287 and a light chain variable region comprising SEQ ID NO: 288;
- kk) a heavy chain variable region comprising SEQ ID NO: 295 and a light chain variable region comprising SEQ ID NO: 296;
- ll) a heavy chain variable region comprising SEQ ID NO: 303 and a light chain variable region comprising SEQ ID NO: 304;
- mm) a heavy chain variable region comprising SEQ ID NO: 311 and a light chain variable region comprising SEQ ID NO: 312;
- nn) a heavy chain variable region comprising SEQ ID NO: 319 and a light chain variable region comprising SEQ ID NO: 320;
- oo) a heavy chain variable region comprising SEQ ID NO: 327 and a light chain variable region comprising SEQ ID NO: 328;
- pp) a heavy chain variable region comprising SEQ ID NO: 335 and a light chain variable region comprising SEQ ID NO: 336;
- qq) a heavy chain variable region comprising SEQ ID NO: 343 and a light chain variable region comprising SEQ ID NO: 344;
- rr) a heavy chain variable region comprising SEQ ID NO: 347 and a light chain variable region comprising SEQ ID NO: 348; or
- ss) a heavy chain variable region comprising SEQ ID NO: 349 and a light chain variable region comprising SEQ ID NO: 350.

5. An antibody or antigen-binding fragment thereof comprising a heavy chain variable region comprising

SEQ	ID	NO:	378
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(EVQLVESGGGLXQPGXSLRLSCXTSGFTLSDYYMSWVRQXPGKGLEWVXFMRNK

ANXYTTEYSASVRGRFTISRDTSKSXIYLMNSLXXEDTAVYYCVRDRXGRPFAYW
GQGTLLVTVSS), wherein the X at position i (i=12, 16, 23, 40, 49, 57, 80, 89, 90 and 103) of
SEQ ID NO: 378 is referred as X_{Hi}, wherein X_{H12} is V or I, X_{H16} is G or R, X_{H23} is A or T, X_{H40}
is A or P, X_{H49} is G or S, X_{H57} is A or G, X_{H80} is I or T, X_{H89} is R or K, X_{H90} is A or T, X_{H103} is
D or E; and

a light chain variable region comprising SEQ ID NO: 379
(DIXMTQSPXSLXXXXGXXXXIXCKSSQSLNINQKNFLTWYXQKPGXXPXLLIYW
ASTRESGVPXRFSGSGSGTDFTLXISXXXXEDLXXYYCQNDYTYPLTFGQGTKLEIK),
wherein the X at position i (i=3, 9, 12, 13, 14, 15, 17, 18, 19, 20, 22, 32, 43, 48, 49, 51, 66, 80,
83, 84, 85, 86, 90 and 91) of SEQ ID NO: 379 is referred as X_{Li}, wherein X_{L3} is V or Q, X_{L9} is
D, L or S, X_{L12} is A, S or P, X_{L13} is A or V, X_{L14} is S or T, X_{L15} is L, V or P, X_{L17} is D or E,
X_{L18} is R or P, X_{L19} is A or V, X_{L20} is S or T, X_{L22} is N, T or S, X_{L32} is A or S, X_{L43} is Q or L,
X_{L48} is Q or K, X_{L49} is A, P or S, X_{L51} is K or Q, X_{L66} is S or D, X_{L80} is K or T, X_{L83} is R or S,
X_{L84} is L or V, X_{L85} is Q or E, X_{L86} is A or P, X_{L90} is A or G, X_{L91} is T or V.

6. An antibody or antigen-binding fragment thereof comprising a heavy chain variable region
comprising SEQ ID NO: 380
(QVQLQESGPGLVKPSXLTSLTCXVXGYSITSDYAWNWRQXPGKGLEWIGYISHSGS
TSYNPSLKSRTISRDTSKNQFSLKLSSVTAADTAVYYCARSLGRRWYFDVWGQGT
TVTVSS), wherein the X at position i (i=16, 23, 25 and 41) of SEQ ID NO: 380 is referred as
X_{Hi}, wherein X_{H16} is E or Q, X_{H23} is A or T, X_{H25} is S or Y, X_{H41} is H or P; and

a light chain variable region comprising SEQ ID NO: 381
(DIXMTQSPXSLXXXXGXXXXIXCKSSQSLXSTQKNYLAWYXQKPGXXPXLLIYF
ASTRDSGVPXRFSGSGSGTDFTLXISXXXXEDLXXYFCQGHYIIPFTFGQGTKLEIK),
wherein the X at position i (i=3, 9, 12, 13, 14, 15, 17, 18, 19, 20, 22, 31, 43, 48, 49, 51, 66, 80,
83, 84, 85, 86, 90 and 91) of SEQ ID NO: 381 is referred as X_{Li}, wherein X_{L3} is V or Q, X_{L9} is
D, L or S, X_{L12} is A, S or P, X_{L13} is A or V, X_{L14} is S or T, X_{L15} is L, V or P, X_{L17} is D or E,
X_{L18} is R or P, X_{L19} is A or V, X_{L20} is S or T, X_{L22} is N, T or S, X_{L31} is N or Q, X_{L43} is Q or L,
X_{L48} is Q or K, X_{L49} is A, P or S, X_{L51} is K or Q, X_{L66} is S or D, X_{L80} is K or T, X_{L83} is R or S,
X_{L84} is L or V, X_{L85} is Q or E, X_{L86} is A or P, X_{L90} is A or G, X_{L91} is T or V.

7. The antibody or antigen-binding fragment thereof of claim 5, which comprises:

a heavy chain variable region comprising 1, 2, or 3 CDR sequences shown as SEQ ID NO: 9,
SEQ ID NO: 10 or 374 (MRNKANAYTT), and SEQ ID NO: 11 or 375 (VRDREGRPFAY),

respectively; and a kappa light chain variable region comprising 1, 2, or 3 CDR sequences shown as SEQ ID NO: 12 or 376 (QSLLNAINQKNF), SEQ ID NO: 13, and SEQ ID NO: 14, respectively.

8. The antibody or antigen-binding fragment thereof of claim 5, which comprises a heavy chain variable region comprising a sequence selected from SEQ ID NO: 351, 353, 355, 357, 358, 360, 362 and 364; and a light chain variable region comprising a sequence selected from SEQ ID NO: 352, 354, 356, 359, 361 and 363.

9. The antibody or antigen-binding fragment thereof of claim 1, further comprising an immunoglobulin constant region, optionally a constant region of human Ig, or optionally a constant region of human IgG.

10. The antibody or antigen-binding fragment thereof of claim 1, which is a Fab, a Fab', a F(ab')₂, a Fd, an Fv fragment, a disulfide stabilized Fv fragment (dsFv), a (dsFv)₂, a single-chain antibody molecule (scFv), a camelized single domain antibody, a nanobody, a domain antibody, and a bivalent domain antibody.

11. The antibody or antigen-binding fragment thereof of claim 1, wherein the antibody or antigen-binding fragment is linked to one or more conjugates, optionally, wherein the conjugate is covalently attached either directly or via a linker.

12. A pharmaceutical composition comprising the antibody or antigen-binding fragment thereof of claim 1, and a pharmaceutically acceptable carrier.

13. An isolated polynucleotide encoding the antibody or antigen-binding fragment thereof of claim 1.

14. A vector comprising the isolated polynucleotide of claim 13.

15. A host cell comprising the vector of claim 14.

16. The antibody or antigen-binding fragment thereof of claim 1 for use in treating a disease or condition in a subject that would benefit from modulation of CD276 activity, wherein a

therapeutically effective amount of the antibody or antigen-binding fragment thereof of is to be administered to the subject.

17. The antibody or antigen-binding fragment thereof for use of claim 16, wherein the disease or condition is cancer, adaptive immune disease, autoimmune disease, inflammatory disease, or infectious disease.

18. The antibody or antigen-binding fragment thereof of claim 1 for use in modulating CD276 activity in a CD276-expressing cell, wherein the CD276-expressing cell is to be exposed to the antibody or antigen-binding fragment thereof.

19. The antibody or antigen-binding fragment thereof of claim 6, which comprises:
a heavy chain variable region comprising 1, 2, or 3 CDR sequences shown as SEQ ID NO: 41, SEQ ID NO: 42, and SEQ ID NO: 43, respectively; and a kappa light chain variable region comprising 1, 2, or 3 CDR sequences shown as SEQ ID NO: 44 or 377 (QSL**L**Q**S**STQKNY), SEQ ID NO: 45, and SEQ ID NO: 46, respectively.

20. The antibody or antigen-binding fragment thereof of claim 6, which comprises a heavy chain variable region comprising a sequence selected from SEQ ID NO: 365, 367 and 370; and a light chain variable region comprising a sequence selected from SEQ ID NO: 366, 368, 369, 371, 372 and 373.