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(54) Title: ANTIGEN BINDING MOLECULES TO TIGIT

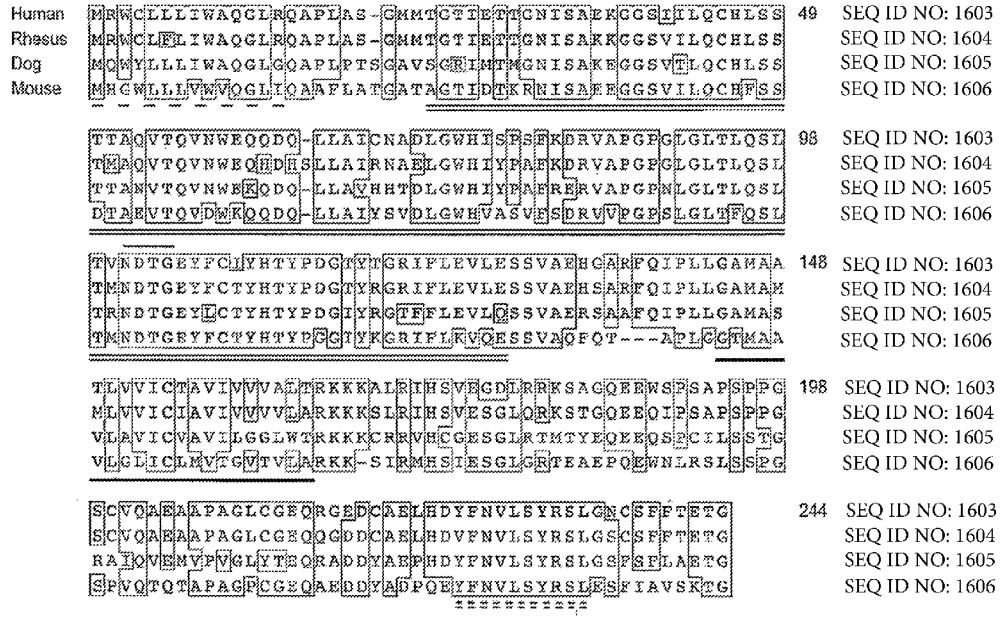


FIG. 1

(57) Abstract: Provided herein are antigen binding molecules that bind to TIGIT, include antibodies and antigen binding fragments thereof.

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[Continued on next page]

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ANTIGEN BINDING MOLECULES TO TIGIT

PRORITY AND CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of U.S. Provisional Application No. 62/429,639, filed on December 2, 2016, which is hereby incorporated by reference in its entirety.

ELECTRONIC SEQUENCE LISTING

[0002] The present application is being filed along with an Electronic Sequence Listing. The Electronic Sequence Listing is provided as a file entitled RPHAR001WOSEQLIST.txt created November 30, 2017, which is 647,693 bytes in size. The information in the Electronic Sequence Listing is incorporated herein by reference in its entirety.

BACKGROUND

Field

[0003] The present invention relates to antigen binding molecules that bind to TIGIT and the use thereof.

Description of the Related Art

[0004] TIGIT (T cell immunoreceptor with Ig and ITIM domains) has been previously identified as a putative modulator of immune function (see, e.g., US patent publication no. US20040121370, incorporated herein by reference).

[0005] TIGIT is an immunomodulatory receptor expressed primarily on activated T cells and NK cells. TIGIT is also known as VSIG9; VSTM3; and WUCAM. Its structure shows one extracellular immunoglobulin domain, a type 1 transmembrane region and two ITIM motifs. TIGIT forms part of a co-stimulatory network that consists of positive (CD226)

and negative (TIGIT) immunomodulatory receptors on T cells, and ligands expressed on APCs (CD155 and CD112).

[0006] The TIGIT protein includes an immunoreceptor tyrosine-based inhibition motif (ITIM) in its cytoplasmic tail domain. As with PD-1 and CTLA- 4, the ITIM domain in the cytoplasmic region of TIGIT is predicted to recruit tyrosine phosphatases, such as SHP-1 and SHP-2, and subsequent de-phosphorylation of tyrosine residues with in the immunoreceptor tyrosine-base activation motifs (IT AM) on T cell receptor (TCR) subunits. Hence, ligation of TIGIT by receptor-ligands CD155 and CD112 expressed by tumor cells or TAMS may contribute to the suppression of TCR-signaling and T cell activation, which is involved in mounting effective anti-tumor immunity.

SUMMARY

[0007] Some embodiments provided herein relate to antigen binding molecules that bind to TIGIT and comprise one or more of the sequence and/or structural aspects outlined in FIGs. 2A, 2B, 2C, 3A, 3B, and 3C.

[0008] In some embodiments, an isolated antigen binding molecule that competes for binding to human TIGIT with an antibody comprises any one or more of a CDR within any of SEQ ID NO. 1 – SEQ ID NO: 97, SEQ ID NO: 195 – SEQ ID NO: 209, SEQ ID NO: 225 – SEQ ID NO: 310, SEQ ID NO: 98 – SEQ ID NO: 194, SEQ ID NO: 210 – SEQ ID NO: 224, or SEQ ID NO: 311 – SEQ ID NO: 396 any of in figures 2A, 2B, 2C, 3A, 3B, or 3C.

[0009] In some embodiments, an isolated antigen binding molecule that binds to human TIGIT comprises: (a) a heavy chain CDR1 comprising the amino acid sequence of any one of the HCDR1s in SEQ ID NO: 397, SEQ ID NO: 403. SEQ ID NO: 409, SEQ ID NO: 415, SEQ ID NO: 421, SEQ ID NO: 427, SEQ ID NO: 433, SEQ ID NO: 439, SEQ ID NO: 445, SEQ ID NO: 451, SEQ ID NO: 457, SEQ ID NO: 463, SEQ ID NO: 469, SEQ ID NO: 475, SEQ ID NO: 481, SEQ ID NO: 487, SEQ ID NO: 493, SEQ ID NO: 499, SEQ ID NO: 505, SEQ ID NO: 511, SEQ ID NO: 517, SEQ ID NO: 523, SEQ ID NO: 529, SEQ ID NO: 535, SEQ ID NO: 541, SEQ ID NO: 547, SEQ ID NO: 553, SEQ ID NO: 559, SEQ ID NO: 565, SEQ ID NO: 571, SEQ ID NO: 577, SEQ ID NO: 583, SEQ ID NO: 589, SEQ ID NO:

595, SEQ ID NO: 601, SEQ ID NO: 607, SEQ ID NO: 613, SEQ ID NO: 619, SEQ ID NO: 625, SEQ ID NO: 631, SEQ ID NO: 637, SEQ ID NO: 643, SEQ ID NO: 649, SEQ ID NO: 655, SEQ ID NO: 661, SEQ ID NO: 667, SEQ ID NO: 673, SEQ ID NO: 679, SEQ ID NO: 685, SEQ ID NO: 691, SEQ ID NO: 697, SEQ ID NO: 703, SEQ ID NO: 709, SEQ ID NO: 715, SEQ ID NO: 721, SEQ ID NO: 727, SEQ ID NO: 733, SEQ ID NO: 739, SEQ ID NO: 745, SEQ ID NO: 751, SEQ ID NO: 757, SEQ ID NO: 763, SEQ ID NO: 769, SEQ ID NO: 775, SEQ ID NO: 781, SEQ ID NO: 787, SEQ ID NO: 793, SEQ ID NO: 799, SEQ ID NO: 805, SEQ ID NO: 811, SEQ ID NO: 817, SEQ ID NO: 823, SEQ ID NO: 829, SEQ ID NO: 835, SEQ ID NO: 841, SEQ ID NO: 847, SEQ ID NO: 853, SEQ ID NO: 859, SEQ ID NO: 865, SEQ ID NO: 871, SEQ ID NO: 877, SEQ ID NO: 883, SEQ ID NO: 889, SEQ ID NO: 895, SEQ ID NO: 901, SEQ ID NO: 907, SEQ ID NO: 913, SEQ ID NO: 919, SEQ ID NO: 925, SEQ ID NO: 931, SEQ ID NO: 937, SEQ ID NO: 943, SEQ ID NO: 949, SEQ ID NO: 955, SEQ ID NO: 961, SEQ ID NO: 967, SEQ ID NO: 973, SEQ ID NO: 979, SEQ ID NO: 985, SEQ ID NO: 991, SEQ ID NO: 997, SEQ ID NO: 1003, SEQ ID NO: 1009, SEQ ID NO: 1015, SEQ ID NO: 1021, SEQ ID NO: 1027, SEQ ID NO: 1033, SEQ ID NO: 1039, SEQ ID NO: 1045, SEQ ID NO: 1051, SEQ ID NO: 1057, SEQ ID NO: 1063, SEQ ID NO: 1069, SEQ ID NO: 1075, SEQ ID NO: 1081, SEQ ID NO: 1087, SEQ ID NO: 1093, SEQ ID NO: 1099, SEQ ID NO: 1105, SEQ ID NO: 1111, SEQ ID NO: 1117, SEQ ID NO: 1123, SEQ ID NO: 1129, SEQ ID NO: 1135, SEQ ID NO: 1141, SEQ ID NO: 1147, SEQ ID NO: 1153, SEQ ID NO: 1159, SEQ ID NO: 1165, SEQ ID NO: 1171, SEQ ID NO: 1177, SEQ ID NO: 1183, SEQ ID NO: 1189, SEQ ID NO: 1195, SEQ ID NO: 1201, SEQ ID NO: 1207, SEQ ID NO: 1213, SEQ ID NO: 1219, SEQ ID NO: 1225, SEQ ID NO: 1231, SEQ ID NO: 1237, SEQ ID NO: 1243, SEQ ID NO: 1249, SEQ ID NO: 1255, SEQ ID NO: 1261, SEQ ID NO: 1267, SEQ ID NO: 1273, SEQ ID NO: 1279, SEQ ID NO: 1285, SEQ ID NO: 1291, SEQ ID NO: 1297, SEQ ID NO: 1303, SEQ ID NO: 1309, SEQ ID NO: 1315, SEQ ID NO: 1321, SEQ ID NO: 1327, SEQ ID NO: 1333, SEQ ID NO: 1339, SEQ ID NO: 1345, SEQ ID NO: 1351, SEQ ID NO: 1357, SEQ ID NO: 1363, SEQ ID NO: 1369, SEQ ID NO: 1375, SEQ ID NO: 1381, SEQ ID NO: 1387, SEQ ID NO: 1393, SEQ ID NO: 1399, SEQ ID NO: 1405, SEQ ID NO: 1411, SEQ ID NO: 1417, SEQ ID NO: 1423, SEQ ID NO: 1429, SEQ ID NO: 1435, SEQ ID NO: 1441, SEQ ID NO: 1447, SEQ ID NO: 1453, SEQ ID NO: 1459,

SEQ ID NO: 1465, SEQ ID NO: 1471, SEQ ID NO: 1477, SEQ ID NO: 1483, SEQ ID NO: 1489, SEQ ID NO: 1495, SEQ ID NO: 1501, SEQ ID NO: 1507, SEQ ID NO: 1513, SEQ ID NO: 1519, SEQ ID NO: 1593, SEQ ID NO: 1525 SEQ ID NO: 1531, SEQ ID NO: 1537, SEQ ID NO: 1543, SEQ ID NO: 1549, SEQ ID NO: 1555, SEQ ID NO: 1561, SEQ ID NO: 1567, SEQ ID NO: 1573, SEQ ID NO: 1579, or SEQ ID NO: 1585 in Figure 3A, 3B, or 3C; (b) a heavy chain CDR2 comprising the amino acid sequence of any one of the HCDR2s in SEQ ID NO: 398, SEQ ID NO: 404, SEQ ID NO: 410, SEQ ID NO: 416, SEQ ID NO: 422, SEQ ID NO: 428, SEQ ID NO: 434, SEQ ID NO: 440, SEQ ID NO: 446, SEQ ID NO: 452, SEQ ID NO: 458, SEQ ID NO: 464, SEQ ID NO: 470, SEQ ID NO: 476, SEQ ID NO: 482, SEQ ID NO: 488, SEQ ID NO: 494, SEQ ID NO: 500, SEQ ID NO: 506, SEQ ID NO: 512, SEQ ID NO: 518, SEQ ID NO: 524, SEQ ID NO: 530, SEQ ID NO: 536, SEQ ID NO: 542, SEQ ID NO: 548, SEQ ID NO: 554, SEQ ID NO: 560, SEQ ID NO: 566, SEQ ID NO: 572, SEQ ID NO: 578, SEQ ID NO: 584, SEQ ID NO: 590, SEQ ID NO: 596, SEQ ID NO: 602, SEQ ID NO: 608, SEQ ID NO: 614, SEQ ID NO: 620, SEQ ID NO: 626, SEQ ID NO: 632, SEQ ID NO: 638, SEQ ID NO: 644, SEQ ID NO: 650, SEQ ID NO: 656, SEQ ID NO: 662, SEQ ID NO: 668, SEQ ID NO: 674, SEQ ID NO: 680, SEQ ID NO: 686, SEQ ID NO: 692, SEQ ID NO: 698, SEQ ID NO: 704, SEQ ID NO: 710, SEQ ID NO: 716, SEQ ID NO: 722, SEQ ID NO: 728, SEQ ID NO: 734, SEQ ID NO: 740, SEQ ID NO: 746, SEQ ID NO: 752, SEQ ID NO: 758, SEQ ID NO: 764, SEQ ID NO: 770, SEQ ID NO: 776, SEQ ID NO: 782, SEQ ID NO: 788, SEQ ID NO: 794, SEQ ID NO: 800, SEQ ID NO: 806, SEQ ID NO: 812, SEQ ID NO: 818, SEQ ID NO: 824, SEQ ID NO: 830, SEQ ID NO: 836, SEQ ID NO: 842, SEQ ID NO: 848, SEQ ID NO: 854, SEQ ID NO: 860, SEQ ID NO: 866, SEQ ID NO: 872, SEQ ID NO: 878, SEQ ID NO: 884, SEQ ID NO: 890, SEQ ID NO: 896, SEQ ID NO: 902, SEQ ID NO: 908, SEQ ID NO: 914, SEQ ID NO: 920, SEQ ID NO: 926, SEQ ID NO: 932, SEQ ID NO: 938, SEQ ID NO: 944, SEQ ID NO: 950, SEQ ID NO: 956, SEQ ID NO: 962, SEQ ID NO: 968, SEQ ID NO: 974, SEQ ID NO: 980, SEQ ID NO: 986, SEQ ID NO: 992, SEQ ID NO: 998, SEQ ID NO: 1004, SEQ ID NO: 1010, SEQ ID NO: 1016, SEQ ID NO: 1022, SEQ ID NO: 1028, SEQ ID NO: 1034, SEQ ID NO: 1040, SEQ ID NO: 1046, SEQ ID NO: 1052, SEQ ID NO: 1058, SEQ ID NO: 1064, SEQ ID NO: 1070, SEQ ID NO: 1076, SEQ ID NO: 1082, SEQ ID NO: 1088, SEQ ID NO: 1094, SEQ ID NO: 1100, SEQ ID NO:

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SEQ ID NO: 1587 in Figure 3A, 3B, or 3C, wherein the HCDR1, HCDR2, and HCDR3 are from a same clone.

[0010] In some embodiments, an isolated antigen binding molecule that binds to human TIGIT comprises: (a) a heavy chain CDR1 comprising the amino acid sequence of any of one of the HCDR1s in SEQ ID NO: 397, SEQ ID NO: 403. SEQ ID NO: 409, SEQ ID NO: 415, SEQ ID NO: 421, SEQ ID NO: 427, SEQ ID NO: 433, SEQ ID NO: 439, SEQ ID NO: 445, SEQ ID NO: 451, SEQ ID NO: 457, SEQ ID NO: 463, SEQ ID NO: 469, SEQ ID NO: 475, SEQ ID NO: 481, SEQ ID NO: 487, SEQ ID NO: 493, SEQ ID NO: 499, SEQ ID NO: 505, SEQ ID NO: 511, SEQ ID NO: 517, SEQ ID NO: 523, SEQ ID NO: 529, SEQ ID NO: 535, SEQ ID NO: 541, SEQ ID NO: 547, SEQ ID NO: 553, SEQ ID NO: 559, SEQ ID NO: 565, SEQ ID NO: 571, SEQ ID NO: 577, SEQ ID NO: 583, SEQ ID NO: 589, SEQ ID NO: 595, SEQ ID NO: 601, SEQ ID NO: 607, SEQ ID NO: 613, SEQ ID NO: 619, SEQ ID NO: 625, SEQ ID NO: 631, SEQ ID NO: 637, SEQ ID NO: 643, SEQ ID NO: 649, SEQ ID NO: 655, SEQ ID NO: 661, SEQ ID NO: 667, SEQ ID NO: 673, SEQ ID NO: 679, SEQ ID NO: 685, SEQ ID NO: 691, SEQ ID NO: 697, SEQ ID NO: 703, SEQ ID NO: 709, SEQ ID NO: 715, SEQ ID NO: 721, SEQ ID NO: 727, SEQ ID NO: 733, SEQ ID NO: 739, SEQ ID NO: 745, SEQ ID NO: 751, SEQ ID NO: 757, SEQ ID NO: 763, SEQ ID NO: 769, SEQ ID NO: 775, SEQ ID NO: 781, SEQ ID NO: 787, SEQ ID NO: 793, SEQ ID NO: 799, SEQ ID NO: 805, SEQ ID NO: 811, SEQ ID NO: 817, SEQ ID NO: 823, SEQ ID NO: 829, SEQ ID NO: 835, SEQ ID NO: 841, SEQ ID NO: 847, SEQ ID NO: 853, SEQ ID NO: 859, SEQ ID NO: 865, SEQ ID NO: 871, SEQ ID NO: 877, SEQ ID NO: 883, SEQ ID NO: 889, SEQ ID NO: 895, SEQ ID NO: 901, SEQ ID NO: 907, SEQ ID NO: 913, SEQ ID NO: 919, SEQ ID NO: 925, SEQ ID NO: 931, SEQ ID NO: 937, SEQ ID NO: 943, SEQ ID NO: 949, SEQ ID NO: 955, SEQ ID NO: 961, SEQ ID NO: 967, SEQ ID NO: 973, SEQ ID NO: 979, SEQ ID NO: 985, SEQ ID NO: 991, SEQ ID NO: 997, SEQ ID NO: 1003, SEQ ID NO: 1009, SEQ ID NO: 1015, SEQ ID NO: 1021, SEQ ID NO: 1027, SEQ ID NO: 1033, SEQ ID NO: 1039, SEQ ID NO: 1045, SEQ ID NO: 1051, SEQ ID NO: 1057, SEQ ID NO: 1063, SEQ ID NO: 1069, SEQ ID NO: 1075, SEQ ID NO: 1081, SEQ ID NO: 1087, SEQ ID NO: 1093, SEQ ID NO: 1099, SEQ ID NO: 1105, SEQ ID NO: 1111, SEQ ID NO: 1117, SEQ ID NO: 1123, SEQ ID NO: 1129, SEQ ID NO: 1135, SEQ ID NO: 1141, SEQ ID NO: 1147, SEQ ID NO:

1153, SEQ ID NO: 1159, SEQ ID NO: 1165, SEQ ID NO: 1171, SEQ ID NO: 1177, SEQ ID NO: 1183, SEQ ID NO: 1189, SEQ ID NO: 1195, SEQ ID NO: 1201, SEQ ID NO: 1207, SEQ ID NO: 1213, SEQ ID NO: 1219, SEQ ID NO: 1225, SEQ ID NO: 1231, SEQ ID NO: 1237, SEQ ID NO: 1243, SEQ ID NO: 1249, SEQ ID NO: 1255, SEQ ID NO: 1261, SEQ ID NO: 1267, SEQ ID NO: 1273, SEQ ID NO: 1279, SEQ ID NO: 1285, SEQ ID NO: 1291, SEQ ID NO: 1297, SEQ ID NO: 1303, SEQ ID NO: 1309, SEQ ID NO: 1315, SEQ ID NO: 1321, SEQ ID NO: 1327, SEQ ID NO: 1333, SEQ ID NO: 1339, SEQ ID NO: 1345, SEQ ID NO: 1351, SEQ ID NO: 1357, SEQ ID NO: 1363, SEQ ID NO: 1369, SEQ ID NO: 1375, SEQ ID NO: 1381, SEQ ID NO: 1387, SEQ ID NO: 1393, SEQ ID NO: 1399, SEQ ID NO: 1405, SEQ ID NO: 1411, SEQ ID NO: 1417, SEQ ID NO: 1423, SEQ ID NO: 1429, SEQ ID NO: 1435, SEQ ID NO: 1441, SEQ ID NO: 1447, SEQ ID NO: 1453, SEQ ID NO: 1459, SEQ ID NO: 1465, SEQ ID NO: 1471, SEQ ID NO: 1477, SEQ ID NO: 1483, SEQ ID NO: 1489, SEQ ID NO: 1495, SEQ ID NO: 1501, SEQ ID NO: 1507, SEQ ID NO: 1513, SEQ ID NO: 1519, SEQ ID NO: 1593, SEQ ID NO: 1525 SEQ ID NO: 1531, SEQ ID NO: 1537, SEQ ID NO: 1543, SEQ ID NO: 1549, SEQ ID NO: 1555, SEQ ID NO: 1561, SEQ ID NO: 1567, SEQ ID NO: 1573, SEQ ID NO: 1579, or SEQ ID NO: 1585 in Figure 3A, 3B, or 3C; (b) a heavy chain CDR2 comprising the amino acid sequence of any one of the HCDR2s in SEQ ID NO: 398, SEQ ID NO: 404, SEQ ID NO: 410, SEQ ID NO: 416, SEQ ID NO: 422, SEQ ID NO: 428, SEQ ID NO: 434, SEQ ID NO: 440, SEQ ID NO: 446, SEQ ID NO: 452, SEQ ID NO: 458, SEQ ID NO: 464, SEQ ID NO: 470, SEQ ID NO: 476, SEQ ID NO: 482, SEQ ID NO: 488, SEQ ID NO: 494, SEQ ID NO: 500, SEQ ID NO: 506, SEQ ID NO: 512, SEQ ID NO: 518, SEQ ID NO: 524, SEQ ID NO: 530, SEQ ID NO: 536, SEQ ID NO: 542, SEQ ID NO: 548, SEQ ID NO: 554, SEQ ID NO: 560, SEQ ID NO: 566, SEQ ID NO: 572, SEQ ID NO: 578, SEQ ID NO: 584, SEQ ID NO: 590, SEQ ID NO: 596, SEQ ID NO: 602, SEQ ID NO: 608, SEQ ID NO: 614, SEQ ID NO: 620, SEQ ID NO: 626, SEQ ID NO: 632, SEQ ID NO: 638, SEQ ID NO: 644, SEQ ID NO: 650, SEQ ID NO: 656, SEQ ID NO: 662, SEQ ID NO: 668, SEQ ID NO: 674, SEQ ID NO: 680, SEQ ID NO: 686, SEQ ID NO: 692, SEQ ID NO: 698, SEQ ID NO: 704, SEQ ID NO: 710, SEQ ID NO: 716, SEQ ID NO: 722, SEQ ID NO: 728, SEQ ID NO: 734, SEQ ID NO: 740, SEQ ID NO: 746, SEQ ID NO: 752, SEQ ID NO: 758, SEQ ID NO: 764, SEQ ID NO: 770, SEQ ID NO: 776, SEQ ID NO: 782,

SEQ ID NO: 788, SEQ ID NO: 794, SEQ ID NO: 800, SEQ ID NO: 806, SEQ ID NO: 812, SEQ ID NO: 818, SEQ ID NO: 824, SEQ ID NO: 830, SEQ ID NO: 836, SEQ ID NO: 842, SEQ ID NO: 848, SEQ ID NO: 854, SEQ ID NO: 860, SEQ ID NO: 866, SEQ ID NO: 872, SEQ ID NO: 878, SEQ ID NO: 884, SEQ ID NO: 890, SEQ ID NO: 896, SEQ ID NO: 902, SEQ ID NO: 908, SEQ ID NO: 914, SEQ ID NO: 920, SEQ ID NO: 926, SEQ ID NO: 932, SEQ ID NO: 938, SEQ ID NO: 944, SEQ ID NO: 950, SEQ ID NO: 956, SEQ ID NO: 962, SEQ ID NO: 968, SEQ ID NO: 974, SEQ ID NO: 980, SEQ ID NO: 986, SEQ ID NO: 992, SEQ ID NO: 998, SEQ ID NO: 1004, SEQ ID NO: 1010, SEQ ID NO: 1016, SEQ ID NO: 1022, SEQ ID NO: 1028, SEQ ID NO: 1034, SEQ ID NO: 1040, SEQ ID NO: 1046, SEQ ID NO: 1052, SEQ ID NO: 1058, SEQ ID NO: 1064, SEQ ID NO: 1070, SEQ ID NO: 1076, SEQ ID NO: 1082, SEQ ID NO: 1088, SEQ ID NO: 1094, SEQ ID NO: 1100, SEQ ID NO: 1106, SEQ ID NO: 1112, SEQ ID NO: 1118, SEQ ID NO: 1124, SEQ ID NO: 1130, SEQ ID NO: 1136, SEQ ID NO: 1142, SEQ ID NO: 1148, SEQ ID NO: 1154, SEQ ID NO: 1160, SEQ ID NO: 1166, SEQ ID NO: 1172, SEQ ID NO: 1178, SEQ ID NO: 1184, SEQ ID NO: 1190, SEQ ID NO: 1196, SEQ ID NO: 1202, SEQ ID NO: 1208, SEQ ID NO: 1214, SEQ ID NO: 1220, SEQ ID NO: 1226, SEQ ID NO: 1232, SEQ ID NO: 1238, SEQ ID NO: 1244, SEQ ID NO: 1250, SEQ ID NO: 1256, SEQ ID NO: 1262, SEQ ID NO: 1268, SEQ ID NO: 1274, SEQ ID NO: 1280, SEQ ID NO: 1286, SEQ ID NO: 1292, SEQ ID NO: 1298, SEQ ID NO: 1304, SEQ ID NO: 1310, SEQ ID NO: 1316, SEQ ID NO: 1322, SEQ ID NO: 1328, SEQ ID NO: 1334, SEQ ID NO: 1340, SEQ ID NO: 1346, SEQ ID NO: 1352, SEQ ID NO: 1358, SEQ ID NO: 1364, SEQ ID NO: 1370, SEQ ID NO: 1376, SEQ ID NO: 1382, SEQ ID NO: 1388, SEQ ID NO: 1394, SEQ ID NO: 1400, SEQ ID NO: 1406, SEQ ID NO: 1412, SEQ ID NO: 1418, SEQ ID NO: 1424, SEQ ID NO: 1430, SEQ ID NO: 1436, SEQ ID NO: 1442, SEQ ID NO: 1448, SEQ ID NO: 1454, SEQ ID NO: 1460, SEQ ID NO: 1466, SEQ ID NO: 1472, SEQ ID NO: 1478, SEQ ID NO: 1484, SEQ ID NO: 1490, SEQ ID NO: 1496, SEQ ID NO: 1502, SEQ ID NO: 1508, SEQ ID NO: 1514, SEQ ID NO: 1520, SEQ ID NO: 1594, SEQ ID NO: 1526, SEQ ID NO: 1532, SEQ ID NO: 1538, SEQ ID NO: 1544, SEQ ID NO: 1550, SEQ ID NO: 1556, SEQ ID NO: 1562, SEQ ID NO: 1568, SEQ ID NO: 1574, SEQ ID NO: 1580, or SEQ ID NO: 1586 in Figure 3A, 3B, or 3C; (c) a heavy chain CDR3 comprising the amino acid sequence of any one of the HCDR3s in SEQ ID NO: 399, SEQ ID

NO: 405, SEQ ID NO: 411, SEQ ID NO: 417, SEQ ID NO: 423, SEQ ID NO: 429, SEQ ID NO: 435, SEQ ID NO: 441, SEQ ID NO: 447, SEQ ID NO: 453, SEQ ID NO: 459, SEQ ID NO: 465, SEQ ID NO: 471, SEQ ID NO: 477, SEQ ID NO: 483, SEQ ID NO: 489, SEQ ID NO: 495, SEQ ID NO: 501, SEQ ID NO: 507, SEQ ID NO: 513, SEQ ID NO: 519, SEQ ID NO: 525, SEQ ID NO: 531, SEQ ID NO: 537, SEQ ID NO: 543, SEQ ID NO: 549, SEQ ID NO: 555, SEQ ID NO: 561, SEQ ID NO: 567, SEQ ID NO: 573, SEQ ID NO: 579, SEQ ID NO: 585, SEQ ID NO: 591, SEQ ID NO: 597, SEQ ID NO: 603, SEQ ID NO: 609, SEQ ID NO: 615, SEQ ID NO: 621, SEQ ID NO: 627, SEQ ID NO: 633, SEQ ID NO: 639, SEQ ID NO: 645, SEQ ID NO: 651, SEQ ID NO: 657, SEQ ID NO: 663, SEQ ID NO: 669, SEQ ID NO: 675, SEQ ID NO: 681, SEQ ID NO: 687, SEQ ID NO: 693, SEQ ID NO: 699, SEQ ID NO: 705, SEQ ID NO: 711, SEQ ID NO: 717, SEQ ID NO: 723, SEQ ID NO: 729, SEQ ID NO: 735, SEQ ID NO: 741, SEQ ID NO: 747, SEQ ID NO: 753, SEQ ID NO: 759, SEQ ID NO: 765, SEQ ID NO: 771, SEQ ID NO: 777, SEQ ID NO: 783, SEQ ID NO: 789, SEQ ID NO: 795, SEQ ID NO: 801, SEQ ID NO: 807, SEQ ID NO: 813, SEQ ID NO: 819, SEQ ID NO: 825, SEQ ID NO: 831, SEQ ID NO: 837, SEQ ID NO: 843, SEQ ID NO: 849, SEQ ID NO: 855, SEQ ID NO: 861, SEQ ID NO: 867, SEQ ID NO: 873, SEQ ID NO: 879, SEQ ID NO: 885, SEQ ID NO: 891, SEQ ID NO: 897, SEQ ID NO: 903, SEQ ID NO: 909, SEQ ID NO: 915, SEQ ID NO: 921, SEQ ID NO: 927, SEQ ID NO: 933, SEQ ID NO: 939, SEQ ID NO: 945, SEQ ID NO: 951, SEQ ID NO: 957, SEQ ID NO: 963, SEQ ID NO: 969, SEQ ID NO: 975, SEQ ID NO: 981, SEQ ID NO: 987, SEQ ID NO: 993, SEQ ID NO: 999, SEQ ID NO: 1005, SEQ ID NO: 1011, SEQ ID NO: 1017, SEQ ID NO: 1023, SEQ ID NO: 1029, SEQ ID NO: 1035, SEQ ID NO: 1041, SEQ ID NO: 1047, SEQ ID NO: 1053, SEQ ID NO: 1059, SEQ ID NO: 1065, SEQ ID NO: 1071, SEQ ID NO: 1077, SEQ ID NO: 1083, SEQ ID NO: 1089, SEQ ID NO: 1095, SEQ ID NO: 1101, SEQ ID NO: 1107, SEQ ID NO: 1113, SEQ ID NO: 1119, SEQ ID NO: 1125, SEQ ID NO: 1131, SEQ ID NO: 1137, SEQ ID NO: 1143, SEQ ID NO: 1149, SEQ ID NO: 1155, SEQ ID NO: 1161, SEQ ID NO: 1167, SEQ ID NO: 1173, SEQ ID NO: 1179, SEQ ID NO: 1185, SEQ ID NO: 1191, SEQ ID NO: 1197, SEQ ID NO: 1203, SEQ ID NO: 1209, SEQ ID NO: 1215, SEQ ID NO: 1221, SEQ ID NO: 1227, SEQ ID NO: 1233, SEQ ID NO: 1239, SEQ ID NO: 1245, SEQ ID NO: 1251, SEQ ID NO: 1257, SEQ ID NO: 1263, SEQ ID NO: 1269, SEQ ID NO: 1275, SEQ ID NO: 1281,

SEQ ID NO: 1287, SEQ ID NO: 1293, SEQ ID NO: 1299, SEQ ID NO: 1305, SEQ ID NO: 1311, SEQ ID NO: 1317, SEQ ID NO: 1323, SEQ ID NO: 1329, SEQ ID NO: 1335, SEQ ID NO: 1341, SEQ ID NO: 1347, SEQ ID NO: 1353, SEQ ID NO: 1359, SEQ ID NO: 1365, SEQ ID NO: 1371, SEQ ID NO: 1377, SEQ ID NO: 1383, SEQ ID NO: 1389, SEQ ID NO: 1395, SEQ ID NO: 1401, SEQ ID NO: 1407, SEQ ID NO: 1413, SEQ ID NO: 1419, SEQ ID NO: 1425, SEQ ID NO: 1431, SEQ ID NO: 1437, SEQ ID NO: 1443, SEQ ID NO: 1449, SEQ ID NO: 1455, SEQ ID NO: 1461, SEQ ID NO: 1467, SEQ ID NO: 1473, SEQ ID NO: 1479, SEQ ID NO: 1485, SEQ ID NO: 1491, SEQ ID NO: 1497, SEQ ID NO: 1503, SEQ ID NO: 1509, SEQ ID NO: 1515, SEQ ID NO: 1521, SEQ ID NO: 1595, SEQ ID NO: 1527, SEQ ID NO: 1533, SEQ ID NO: 1539, SEQ ID NO: 1545, SEQ ID NO: 1551, SEQ ID NO: 1557, SEQ ID NO: 1563, SEQ ID NO: 1569, SEQ ID NO: 1575, SEQ ID NO: 1581, or SEQ ID NO: 1587 in Figure 3A, 3B, or 3C; (d) a light chain CDR1 comprising the amino acid sequence of any one of the LCDR1s in SEQ ID NO: 400, SEQ ID NO: 406, SEQ ID NO: 412, SEQ ID NO: 418, SEQ ID NO: 424, SEQ ID NO: 430, SEQ ID NO: 436, SEQ ID NO: 442, SEQ ID NO: 448, SEQ ID NO: 454, SEQ ID NO: 460, SEQ ID NO: 466, SEQ ID NO: 472, SEQ ID NO: 478, SEQ ID NO: 484, SEQ ID NO: 490, SEQ ID NO: 496, SEQ ID NO: 502, SEQ ID NO: 508, SEQ ID NO: 514, SEQ ID NO: 520, SEQ ID NO: 526, SEQ ID NO: 532, SEQ ID NO: 538, SEQ ID NO: 544, SEQ ID NO: 550, SEQ ID NO: 556, SEQ ID NO: 562, SEQ ID NO: 568, SEQ ID NO: 574, SEQ ID NO: 580, SEQ ID NO: 586, SEQ ID NO: 592, SEQ ID NO: 598, SEQ ID NO: 604, SEQ ID NO: 610, SEQ ID NO: 616, SEQ ID NO: 622, SEQ ID NO: 628, SEQ ID NO: 634, SEQ ID NO: 640, SEQ ID NO: 646, SEQ ID NO: 652, SEQ ID NO: 658, SEQ ID NO: 664, SEQ ID NO: 670, SEQ ID NO: 676, SEQ ID NO: 682, SEQ ID NO: 688, SEQ ID NO: 694, SEQ ID NO: 700, SEQ ID NO: 706, SEQ ID NO: 712, SEQ ID NO: 718, SEQ ID NO: 724, SEQ ID NO: 730, SEQ ID NO: 736, SEQ ID NO: 742, SEQ ID NO: 748, SEQ ID NO: 754, SEQ ID NO: 760, SEQ ID NO: 766, SEQ ID NO: 772, SEQ ID NO: 778, SEQ ID NO: 784, SEQ ID NO: 790, SEQ ID NO: 796, SEQ ID NO: 802, SEQ ID NO: 808, SEQ ID NO: 814, SEQ ID NO: 820, SEQ ID NO: 826, SEQ ID NO: 832, SEQ ID NO: 838, SEQ ID NO: 844, SEQ ID NO: 850, SEQ ID NO: 856, SEQ ID NO: 862, SEQ ID NO: 868, SEQ ID NO: 874, SEQ ID NO: 880, SEQ ID NO: 886, SEQ ID NO: 892, SEQ ID NO: 898, SEQ ID NO: 904, SEQ ID NO: 910, SEQ ID NO: 916, SEQ ID NO:

922, SEQ ID NO: 928, SEQ ID NO: 934, SEQ ID NO: 940, SEQ ID NO: 946, SEQ ID NO: 952, SEQ ID NO: 958, SEQ ID NO: 964, SEQ ID NO: 970, SEQ ID NO: 976, SEQ ID NO: 982, SEQ ID NO: 988, SEQ ID NO: 994, SEQ ID NO: 1000, SEQ ID NO: 1006, SEQ ID NO: 1012, SEQ ID NO: 1018, SEQ ID NO: 1024, SEQ ID NO: 1030, SEQ ID NO: 1036, SEQ ID NO: 1042, SEQ ID NO: 1048, SEQ ID NO: 1054, SEQ ID NO: 1060, SEQ ID NO: 1066, SEQ ID NO: 1072, SEQ ID NO: 1078, SEQ ID NO: 1084, SEQ ID NO: 1090, SEQ ID NO: 1096, SEQ ID NO: 1102, SEQ ID NO: 1108, SEQ ID NO: 1114, SEQ ID NO: 1120, SEQ ID NO: 1126, SEQ ID NO: 1132, SEQ ID NO: 1138, SEQ ID NO: 1144, SEQ ID NO: 1150, SEQ ID NO: 1156, SEQ ID NO: 1162, SEQ ID NO: 1168, SEQ ID NO: 1174, SEQ ID NO: 1180, SEQ ID NO: 1186, SEQ ID NO: 1192, SEQ ID NO: 1198, SEQ ID NO: 1204, SEQ ID NO: 1210, SEQ ID NO: 1216, SEQ ID NO: 1222, SEQ ID NO: 1228, SEQ ID NO: 1234, SEQ ID NO: 1240, SEQ ID NO: 1246, SEQ ID NO: 1252, SEQ ID NO: 1258, SEQ ID NO: 1264, SEQ ID NO: 1270, SEQ ID NO: 1276, SEQ ID NO: 1282, SEQ ID NO: 1288, SEQ ID NO: 1294, SEQ ID NO: 1300, SEQ ID NO: 1306, SEQ ID NO: 1312, SEQ ID NO: 1318, SEQ ID NO: 1324, SEQ ID NO: 1330, SEQ ID NO: 1336, SEQ ID NO: 1342, SEQ ID NO: 1348, SEQ ID NO: 1354, SEQ ID NO: 1360, SEQ ID NO: 1366, SEQ ID NO: 1372, SEQ ID NO: 1378, SEQ ID NO: 1384, SEQ ID NO: 1390, SEQ ID NO: 1396, SEQ ID NO: 1402, SEQ ID NO: 1408, SEQ ID NO: 1414, SEQ ID NO: 1420, SEQ ID NO: 1426, SEQ ID NO: 1432, SEQ ID NO: 1438, SEQ ID NO: 1444, SEQ ID NO: 1450. SEQ ID NO: 1456, SEQ ID NO: 1462, SEQ ID NO: 1468, SEQ ID NO: 1474, SEQ ID NO: 1480, SEQ ID NO: 1486, SEQ ID NO: 1492, SEQ ID NO: 1498, SEQ ID NO: 1504, SEQ ID NO: 1510, SEQ ID NO: 1516, SEQ ID NO: 1522, SEQ ID NO: 1596, SEQ ID NO: 1528, SEQ ID NO: 1534, SEQ ID NO: 1540, SEQ ID NO: 1546, SEQ ID NO: 1552, SEQ ID NO: 1558, SEQ ID NO: 1564, SEQ ID NO: 1570, SEQ ID NO: 1576, SEQ ID NO: 1582, or SEQ ID NO: 1588 in Figure 3A, 3B, or 3C; (e) a light chain CDR2 comprising the amino acid sequence of any one of the LCDR2s in SEQ ID NO: 401, SEQ ID NO: 407, SEQ ID NO: 413, SEQ ID NO: 419, SEQ ID NO: 425, SEQ ID NO: 431, SEQ ID NO: 437, SEQ ID NO: 443, SEQ ID NO: 449, SEQ ID NO: 455, SEQ ID NO: 461, SEQ ID NO: 467, SEQ ID NO: 473, SEQ ID NO: 479, SEQ ID NO: 485, SEQ ID NO: 491, SEQ ID NO: 497, SEQ ID NO: 503, SEQ ID NO: 509, SEQ ID NO: 515, SEQ ID NO: 521, SEQ ID NO: 527, SEQ ID NO: 533, SEQ ID NO: 539,

SEQ ID NO: 545, SEQ ID NO: 551, SEQ ID NO: 557, SEQ ID NO: 563, SEQ ID NO: 569, SEQ ID NO: 575, SEQ ID NO: 581, SEQ ID NO: 587, SEQ ID NO: 593, SEQ ID NO: 599, SEQ ID NO: 605, SEQ ID NO: 611, SEQ ID NO: 617, SEQ ID NO: 623, SEQ ID NO: 629, SEQ ID NO: 635, SEQ ID NO: 641, SEQ ID NO: 647, SEQ ID NO: 653, SEQ ID NO: 659, SEQ ID NO: 665, SEQ ID NO: 671, SEQ ID NO: 677, SEQ ID NO: 683, SEQ ID NO: 689, SEQ ID NO: 695, SEQ ID NO: 701, SEQ ID NO: 707, SEQ ID NO: 713, SEQ ID NO: 719, SEQ ID NO: 725, SEQ ID NO: 731, SEQ ID NO: 737, SEQ ID NO: 743, SEQ ID NO: 749, SEQ ID NO: 755, SEQ ID NO: 761, SEQ ID NO: 767, SEQ ID NO: 773, SEQ ID NO: 779, SEQ ID NO: 785, SEQ ID NO: 791, SEQ ID NO: 797, SEQ ID NO: 803, SEQ ID NO: 809, SEQ ID NO: 815, SEQ ID NO: 821, SEQ ID NO: 827, SEQ ID NO: 833, SEQ ID NO: 839, SEQ ID NO: 845, SEQ ID NO: 851, SEQ ID NO: 857, SEQ ID NO: 863, SEQ ID NO: 869, SEQ ID NO: 875, SEQ ID NO: 881, SEQ ID NO: 887, SEQ ID NO: 893, SEQ ID NO: 899, SEQ ID NO: 905, SEQ ID NO: 911, SEQ ID NO: 917, SEQ ID NO: 923, SEQ ID NO: 929, SEQ ID NO: 935, SEQ ID NO: 941, SEQ ID NO: 947, SEQ ID NO: 953, SEQ ID NO: 959, SEQ ID NO: 965, SEQ ID NO: 971, SEQ ID NO: 977, SEQ ID NO: 983, SEQ ID NO: 989, SEQ ID NO: 995, SEQ ID NO: 1001, SEQ ID NO: 1007, SEQ ID NO: 1013, SEQ ID NO: 1019, SEQ ID NO: 1025, SEQ ID NO: 1031, SEQ ID NO: 1037, SEQ ID NO: 1043, SEQ ID NO: 1049, SEQ ID NO: 1055, SEQ ID NO: 1061, SEQ ID NO: 1067, SEQ ID NO: 1073, SEQ ID NO: 1079, SEQ ID NO: 1085, SEQ ID NO: 1091, SEQ ID NO: 1097, SEQ ID NO: 1103, SEQ ID NO: 1109, SEQ ID NO: 1115, SEQ ID NO: 1121, SEQ ID NO: 1127, SEQ ID NO: 1133, SEQ ID NO: 1139, SEQ ID NO: 1145, SEQ ID NO: 1151, SEQ ID NO: 1157, SEQ ID NO: 1163, SEQ ID NO: 1169, SEQ ID NO: 1175, SEQ ID NO: 1181, SEQ ID NO: 1187, SEQ ID NO: 1193, SEQ ID NO: 1199, SEQ ID NO: 1205, SEQ ID NO: 1211, SEQ ID NO: 1217, SEQ ID NO: 1223, SEQ ID NO: 1229, SEQ ID NO: 1235, SEQ ID NO: 1241, SEQ ID NO: 1247, SEQ ID NO: 1253, SEQ ID NO: 1259, SEQ ID NO: 1265, SEQ ID NO: 1271, SEQ ID NO: 1277, SEQ ID NO: 1283, SEQ ID NO: 1289, SEQ ID NO: 1295, SEQ ID NO: 1301, SEQ ID NO: 1307, SEQ ID NO: 1313, SEQ ID NO: 1319, SEQ ID NO: 1325, SEQ ID NO: 1331, SEQ ID NO: 1337, SEQ ID NO: 1343, SEQ ID NO: 1349, SEQ ID NO: 1355, SEQ ID NO: 1361, SEQ ID NO: 1367, SEQ ID NO: 1373, SEQ ID NO: 1379, SEQ ID NO: 1385, SEQ ID NO: 1391, SEQ ID NO: 1397, SEQ ID NO: 1403, SEQ ID NO: 1409,

SEQ ID NO: 1415, SEQ ID NO: 1421, SEQ ID NO: 1427, SEQ ID NO: 1433, SEQ ID NO: 1439, SEQ ID NO: 1445, SEQ ID NO: 1451, SEQ ID NO: 1457, SEQ ID NO: 1463, SEQ ID NO: 1469, SEQ ID NO: 1475, SEQ ID NO: 1481, SEQ ID NO: 1487, SEQ ID NO: 1493, SEQ ID NO: 1499, SEQ ID NO: 1505, SEQ ID NO: 1511, SEQ ID NO: 1517, SEQ ID NO: 1523, SEQ ID NO: 1597, SEQ ID NO: 1529, SEQ ID NO: 1535, SEQ ID NO: 1541, SEQ ID NO: 1547, SEQ ID NO: 1553, SEQ ID NO: 1559, SEQ ID NO: 1565, SEQ ID NO: 1571, SEQ ID NO: 1577, SEQ ID NO: 1583, or SEQ ID NO: 1589 in Figure 3A, 3B, or 3C; and (f) a light chain CDR3 comprising the amino acid sequence of any one of the LCDR3s in SEQ ID NO: 402, SEQ ID NO: 408, SEQ ID NO: 414, SEQ ID NO: 420, SEQ ID NO: 426, SEQ ID NO: 432, SEQ ID NO: 438, SEQ ID NO: 444, SEQ ID NO: 450, SEQ ID NO: 456, SEQ ID NO: 462, SEQ ID NO: 468, SEQ ID NO: 474, SEQ ID NO: 480, SEQ ID NO: 486, SEQ ID NO: 492, SEQ ID NO: 498, SEQ ID NO: 504, SEQ ID NO: 510, SEQ ID NO: 516, SEQ ID NO: 522, SEQ ID NO: 528, SEQ ID NO: 534, SEQ ID NO: 540, SEQ ID NO: 546, SEQ ID NO: 552, SEQ ID NO: 558, SEQ ID NO: 564, SEQ ID NO: 570, SEQ ID NO: 576, SEQ ID NO: 582, SEQ ID NO: 588, SEQ ID NO: 594, SEQ ID NO: 600, SEQ ID NO: 606, SEQ ID NO: 612, SEQ ID NO: 618, SEQ ID NO: 624, SEQ ID NO: 630, SEQ ID NO: 636, SEQ ID NO: 642, SEQ ID NO: 648, SEQ ID NO: 654, SEQ ID NO: 660, SEQ ID NO: 666, SEQ ID NO: 672, SEQ ID NO: 678, SEQ ID NO: 684, SEQ ID NO: 690, SEQ ID NO: 696, SEQ ID NO: 702, SEQ ID NO: 708, SEQ ID NO: 714, SEQ ID NO: 720, SEQ ID NO: 726, SEQ ID NO: 732, SEQ ID NO: 738, SEQ ID NO: 744, SEQ ID NO: 750, SEQ ID NO: 756, SEQ ID NO: 762, SEQ ID NO: 768, SEQ ID NO: 774, SEQ ID NO: 780, SEQ ID NO: 786, SEQ ID NO: 792, SEQ ID NO: 798, SEQ ID NO: 804, SEQ ID NO: 810, SEQ ID NO: 816, SEQ ID NO: 822, SEQ ID NO: 828, SEQ ID NO: 834, SEQ ID NO: 840, SEQ ID NO: 846, SEQ ID NO: 852, SEQ ID NO: 858, SEQ ID NO: 864, SEQ ID NO: 870, SEQ ID NO: 876, SEQ ID NO: 882, SEQ ID NO: 888, SEQ ID NO: 894, SEQ ID NO: 900, SEQ ID NO: 906, SEQ ID NO: 912, SEQ ID NO: 918, SEQ ID NO: 924, SEQ ID NO: 930, SEQ ID NO: 936, SEQ ID NO: 942, SEQ ID NO: 948, SEQ ID NO: 954, SEQ ID NO: 960, SEQ ID NO: 966, SEQ ID NO: 972, SEQ ID NO: 978, SEQ ID NO: 984, SEQ ID NO: 990, SEQ ID NO: 996, SEQ ID NO: 1002, SEQ ID NO: 1008, SEQ ID NO: 1014, SEQ ID NO: 1020, SEQ ID NO: 1026, SEQ ID NO: 1032, SEQ ID NO: 1038, SEQ ID NO: 1044, SEQ ID NO: 1050, SEQ ID NO:

1056, SEQ ID NO: 1062, SEQ ID NO: 1068, SEQ ID NO: 1074, SEQ ID NO: 1080, SEQ ID NO: 1086, SEQ ID NO: 1092, SEQ ID NO: 1098, SEQ ID NO: 1104, SEQ ID NO: 1110, SEQ ID NO: 1116, SEQ ID NO: 1122, SEQ ID NO: 1128, SEQ ID NO: 1134, SEQ ID NO: 1140, SEQ ID NO: 1146, SEQ ID NO: 1152, SEQ ID NO: 1158, SEQ ID NO: 1164, SEQ ID NO: 1170, SEQ ID NO: 1176, SEQ ID NO: 1182, SEQ ID NO: 1188, SEQ ID NO: 1194, SEQ ID NO: 1200, SEQ ID NO: 1206, SEQ ID NO: 1212, SEQ ID NO: 1218, SEQ ID NO: 1224, SEQ ID NO: 1230, SEQ ID NO: 1236, SEQ ID NO: 1242, SEQ ID NO: 1248, SEQ ID NO: 1254, SEQ ID NO: 1260, SEQ ID NO: 1266, SEQ ID NO: 1272, SEQ ID NO: 1278, SEQ ID NO: 1284, SEQ ID NO: 1290, SEQ ID NO: 1296, SEQ ID NO: 1302, SEQ ID NO: 1308, SEQ ID NO: 1314, SEQ ID NO: 1320, SEQ ID NO: 1326, SEQ ID NO: 1332, SEQ ID NO: 1338, SEQ ID NO: 1344, SEQ ID NO: 1350, SEQ ID NO: 1356, SEQ ID NO: 1362, SEQ ID NO: 1368, SEQ ID NO: 1374, SEQ ID NO: 1380, SEQ ID NO: 1386, SEQ ID NO: 1392, SEQ ID NO: 1398, SEQ ID NO: 1404, SEQ ID NO: 1410, SEQ ID NO: 1416, SEQ ID NO: 1422, SEQ ID NO: 1428, SEQ ID NO: 1434, SEQ ID NO: 1440, SEQ ID NO: 1446, SEQ ID NO: 1452, SEQ ID NO: 1458, SEQ ID NO: 1464, SEQ ID NO: 1470, SEQ ID NO: 1476, SEQ ID NO: 1482, SEQ ID NO: 1488, SEQ ID NO: 1494, SEQ ID NO: 1500, SEQ ID NO: 1506, SEQ ID NO: 1512, SEQ ID NO: 1518, SEQ ID NO: 1524, SEQ ID NO: 1598, SEQ ID NO: 1530, SEQ ID NO: 1536, SEQ ID NO: 1542, SEQ ID NO: 1548, SEQ ID NO: 1554, SEQ ID NO: 1560, SEQ ID NO: 1566, SEQ ID NO: 1572, SEQ ID NO: 1578, SEQ ID NO: 1584, or SEQ ID NO: 1590 in Figure 3A, 3B, or 3C, wherein the HCDR1, HCDR2, HCDR3, LCDR1, LCDR2, and LCDR3 are from a same clone.

[0011] In some embodiments, an isolated antigen binding molecule that binds to human TIGIT comprises a heavy chain comprising the heavy chain amino acid variable sequence in any one of SEQ ID NO. 1 – SEQ ID NO: 97, SEQ ID NO: 195 – SEQ ID NO: 209, or SEQ ID NO: 225 – SEQ ID NO: 310 in Figures 2A, 2B, or 2C.

[0012] In some embodiments, an isolated antigen binding molecule that binds to human TIGIT comprises a light chain comprising the light chain amino acid variable sequence in any one of SEQ ID NO: 98 – SEQ ID NO: 194, SEQ ID NO: 210 – SEQ ID NO: 224, or SEQ ID NO: 311 – SEQ ID NO: 396 in Figures 2A, 2B, or 2C.

[0013] In some embodiments, an isolated antigen binding molecule that binds to human TIGIT comprises a heavy chain comprising the heavy chain amino acid variable sequence in any one of SEQ ID NO. 1 – SEQ ID NO: 97, SEQ ID NO: 195 – SEQ ID NO: 209, or SEQ ID NO: 225 – SEQ ID NO: 310 in Figures 2A, 2B, or 2C and a light chain comprising the light chain amino acid variable sequence in any one of SEQ ID NO: 98 – SEQ ID NO: 194, SEQ ID NO: 210 – SEQ ID NO: 224, or SEQ ID NO: 311 – SEQ ID NO: 396 in Figures 2A, 2B, or 2C.

[0014] In some embodiments, an isolated antigen binding molecule that binds to human TIGIT comprises: a heavy chain CDR1 comprising $SSYX_4MX_6$ (SEQ ID NO: 1600) wherein X_4 is A, G, or S and X_6 is H, N, or S; a heavy chain CDR2 comprising $WVY_3Y_4IY_6Y_7Y_8Y_9Y_{10}Y_{11}Y_{12}Y_{13}$ (SEQ ID NO: 1601), wherein Y_3 is S or A, Y_4 is G, N, S, Y, or A, Y_6 is S, K, or N, Y_7 is S, Y, or G, Y_8 is N or S, Y_9 is G, S, A, or T, Y_{10} is G or S, Y_{11} is S, N, or T, Y_{12} is T, K, S, or I, Y_{13} is S, Y, or G; and a heavy chain CDR3 comprising $ARZ_3PYZ_6Z_7WZ_9D$ (SEQ ID NO: 1602), wherein Z_3 is V, A, G, or E, Z_6 is S, D, or G, Z_7 is V or Y, Z_9 is I, A, M, or L.

[0015] In some embodiments, an isolated binding molecule that binds to human TIGIT comprises at least one of: (a) (i) a heavy chain variable region comprising the amino acid sequence of SEQ ID NO: 23 and (ii) a light chain variable region comprising the amino acid sequence of SEQ ID NO: 120; (b) (i) a heavy chain variable region comprising the amino acid sequence of SEQ ID NO: 29 and (ii) a light chain variable region comprising the amino acid sequence of SEQ ID NO: 126; (c) (i) a heavy chain variable region comprising the amino acid sequence of SEQ ID NO: 45 and (ii) a light chain variable region comprising the amino acid sequence of SEQ ID NO: 142; (d) (i) a heavy chain variable region comprising the amino acid sequence of SEQ ID NO: 46 and (ii) a light chain variable region comprising the amino acid sequence of SEQ ID NO: 143; (e) (i) a heavy chain variable region comprising the amino acid sequence of SEQ ID NO: 58 and (ii) a light chain variable region comprising the amino acid sequence of SEQ ID NO: 155; (f) (i) a heavy chain variable region comprising the amino acid sequence of SEQ ID NO: 63 and (ii) a light chain variable region comprising the amino acid sequence of SEQ ID NO: 160; (g) (i) a heavy chain variable region comprising the amino acid sequence of SEQ ID NO: 67 and (ii) a light chain

variable region comprising the amino acid sequence of SEQ ID NO: 164; (h) (i) a heavy chain variable region comprising the amino acid sequence of SEQ ID NO: 72 and (ii) a light chain variable region comprising the amino acid sequence of SEQ ID NO: 169; (i) (i) a heavy chain variable region comprising the amino acid sequence of SEQ ID NO: 80 and (ii) a light chain variable region comprising the amino acid sequence of SEQ ID NO: 177; or (j) (i) a heavy chain variable region that is at least 85% identical to any of the heavy chain variable regions in (a)-(i) and (ii) a light chain variable region that is at least 85% identical to any of the light chain variable regions in (a)-(i).

[0016] In some embodiments, an isolated antigen binding molecule that binds to human TIGIT comprises a heavy chain CDR3 of contiguous amino acids $Z_1Z_2Z_3Z_4Z_5Z_6Z_7Z_8Z_9Z_{10}$, (SEQ ID NO: 1599), wherein, Z_1 is A; Z_2 is R; Z_3 is E; Z_4 is P; Z_5 is Y; Z_6 is D, G, or S; Z_7 is V, Y, or T; Z_8 is W; Z_9 is I, L, or M; and Z_{10} is D.

[0017] In some embodiments, an isolated antibody comprises: (a) a heavy chain CDR1 comprising the amino acid sequence of any of one of the HCDR1s in SEQ ID NO: 397, SEQ ID NO: 403. SEQ ID NO: 409, SEQ ID NO: 415, SEQ ID NO: 421, SEQ ID NO: 427, SEQ ID NO: 433, SEQ ID NO: 439, SEQ ID NO: 445, SEQ ID NO: 451, SEQ ID NO: 457, SEQ ID NO: 463, SEQ ID NO: 469, SEQ ID NO: 475, SEQ ID NO: 481, SEQ ID NO: 487, SEQ ID NO: 493, SEQ ID NO: 499, SEQ ID NO: 505, SEQ ID NO: 511, SEQ ID NO: 517, SEQ ID NO: 523, SEQ ID NO: 529, SEQ ID NO: 535, SEQ ID NO: 541, SEQ ID NO: 547, SEQ ID NO: 553, SEQ ID NO: 559, SEQ ID NO: 565, SEQ ID NO: 571, SEQ ID NO: 577, SEQ ID NO: 583, SEQ ID NO: 589, SEQ ID NO: 595, SEQ ID NO: 601, SEQ ID NO: 607, SEQ ID NO: 613, SEQ ID NO: 619, SEQ ID NO: 625, SEQ ID NO: 631, SEQ ID NO: 637, SEQ ID NO: 643, SEQ ID NO: 649, SEQ ID NO: 655, SEQ ID NO: 661, SEQ ID NO: 667, SEQ ID NO: 673, SEQ ID NO: 679, SEQ ID NO: 685, SEQ ID NO: 691, SEQ ID NO: 697, SEQ ID NO: 703, SEQ ID NO: 709, SEQ ID NO: 715, SEQ ID NO: 721, SEQ ID NO: 727, SEQ ID NO: 733, SEQ ID NO: 739, SEQ ID NO: 745, SEQ ID NO: 751, SEQ ID NO: 757, SEQ ID NO: 763, SEQ ID NO: 769, SEQ ID NO: 775, SEQ ID NO: 781, SEQ ID NO: 787, SEQ ID NO: 793, SEQ ID NO: 799, SEQ ID NO: 805, SEQ ID NO: 811, SEQ ID NO: 817, SEQ ID NO: 823, SEQ ID NO: 829, SEQ ID NO: 835, SEQ ID NO: 841, SEQ ID NO: 847, SEQ ID NO: 853, SEQ ID NO: 859, SEQ ID NO: 865, SEQ ID NO: 871, SEQ ID NO:

877, SEQ ID NO: 883, SEQ ID NO: 889, SEQ ID NO: 895, SEQ ID NO: 901, SEQ ID NO: 907, SEQ ID NO: 913, SEQ ID NO: 919, SEQ ID NO: 925, SEQ ID NO: 931, SEQ ID NO: 937, SEQ ID NO: 943, SEQ ID NO: 949, SEQ ID NO: 955, SEQ ID NO: 961, SEQ ID NO: 967, SEQ ID NO: 973, SEQ ID NO: 979, SEQ ID NO: 985, SEQ ID NO: 991, SEQ ID NO: 997, SEQ ID NO: 1003, SEQ ID NO: 1009, SEQ ID NO: 1015, SEQ ID NO: 1021, SEQ ID NO: 1027, SEQ ID NO: 1033, SEQ ID NO: 1039, SEQ ID NO: 1045, SEQ ID NO: 1051, SEQ ID NO: 1057, SEQ ID NO: 1063, SEQ ID NO: 1069, SEQ ID NO: 1075, SEQ ID NO: 1081, SEQ ID NO: 1087, SEQ ID NO: 1093, SEQ ID NO: 1099, SEQ ID NO: 1105, SEQ ID NO: 1111, SEQ ID NO: 1117, SEQ ID NO: 1123, SEQ ID NO: 1129, SEQ ID NO: 1135, SEQ ID NO: 1141, SEQ ID NO: 1147, SEQ ID NO: 1153, SEQ ID NO: 1159, SEQ ID NO: 1165, SEQ ID NO: 1171, SEQ ID NO: 1177, SEQ ID NO: 1183, SEQ ID NO: 1189, SEQ ID NO: 1195, SEQ ID NO: 1201, SEQ ID NO: 1207, SEQ ID NO: 1213, SEQ ID NO: 1219, SEQ ID NO: 1225, SEQ ID NO: 1231, SEQ ID NO: 1237, SEQ ID NO: 1243, SEQ ID NO: 1249, SEQ ID NO: 1255, SEQ ID NO: 1261, SEQ ID NO: 1267, SEQ ID NO: 1273, SEQ ID NO: 1279, SEQ ID NO: 1285, SEQ ID NO: 1291, SEQ ID NO: 1297, SEQ ID NO: 1303, SEQ ID NO: 1309, SEQ ID NO: 1315, SEQ ID NO: 1321, SEQ ID NO: 1327, SEQ ID NO: 1333, SEQ ID NO: 1339, SEQ ID NO: 1345, SEQ ID NO: 1351, SEQ ID NO: 1357, SEQ ID NO: 1363, SEQ ID NO: 1369, SEQ ID NO: 1375, SEQ ID NO: 1381, SEQ ID NO: 1387, SEQ ID NO: 1393, SEQ ID NO: 1399, SEQ ID NO: 1405, SEQ ID NO: 1411, SEQ ID NO: 1417, SEQ ID NO: 1423, SEQ ID NO: 1429, SEQ ID NO: 1435, SEQ ID NO: 1441, SEQ ID NO: 1447, SEQ ID NO: 1453, SEQ ID NO: 1459, SEQ ID NO: 1465, SEQ ID NO: 1471, SEQ ID NO: 1477, SEQ ID NO: 1483, SEQ ID NO: 1489, SEQ ID NO: 1495, SEQ ID NO: 1501, SEQ ID NO: 1507, SEQ ID NO: 1513, SEQ ID NO: 1519, SEQ ID NO: 1593, SEQ ID NO: 1525 SEQ ID NO: 1531, SEQ ID NO: 1537, SEQ ID NO: 1543, SEQ ID NO: 1549, SEQ ID NO: 1555, SEQ ID NO: 1561, SEQ ID NO: 1567, SEQ ID NO: 1573, SEQ ID NO: 1579, or SEQ ID NO: 1585 in Figure 3A, 3B, or 3C; (b) a heavy chain CDR2 comprising the amino acid sequence of any one of the HCDR2s in in SEQ ID NO: 398, SEQ ID NO: 404, SEQ ID NO: 410, SEQ ID NO: 416, SEQ ID NO: 422, SEQ ID NO: 428, SEQ ID NO: 434, SEQ ID NO: 440, SEQ ID NO: 446, SEQ ID NO: 452, SEQ ID NO: 458, SEQ ID NO: 464, SEQ ID NO: 470, SEQ ID NO: 476, SEQ ID NO: 482, SEQ ID NO: 488, SEQ ID NO: 494,

SEQ ID NO: 500, SEQ ID NO: 506, SEQ ID NO: 512, SEQ ID NO: 518, SEQ ID NO: 524, SEQ ID NO: 530, SEQ ID NO: 536, SEQ ID NO: 542, SEQ ID NO: 548, SEQ ID NO: 554, SEQ ID NO: 560, SEQ ID NO: 566, SEQ ID NO: 572, SEQ ID NO: 578, SEQ ID NO: 584, SEQ ID NO: 590, SEQ ID NO: 596, SEQ ID NO: 602, SEQ ID NO: 608, SEQ ID NO: 614, SEQ ID NO: 620, SEQ ID NO: 626, SEQ ID NO: 632, SEQ ID NO: 638, SEQ ID NO: 644, SEQ ID NO: 650, SEQ ID NO: 656, SEQ ID NO: 662, SEQ ID NO: 668, SEQ ID NO: 674, SEQ ID NO: 680, SEQ ID NO: 686, SEQ ID NO: 692, SEQ ID NO: 698, SEQ ID NO: 704, SEQ ID NO: 710, SEQ ID NO: 716, SEQ ID NO: 722, SEQ ID NO: 728, SEQ ID NO: 734, SEQ ID NO: 740, SEQ ID NO: 746, SEQ ID NO: 752, SEQ ID NO: 758, SEQ ID NO: 764, SEQ ID NO: 770, SEQ ID NO: 776, SEQ ID NO: 782, SEQ ID NO: 788, SEQ ID NO: 794, SEQ ID NO: 800, SEQ ID NO: 806, SEQ ID NO: 812, SEQ ID NO: 818, SEQ ID NO: 824, SEQ ID NO: 830, SEQ ID NO: 836, SEQ ID NO: 842, SEQ ID NO: 848, SEQ ID NO: 854, SEQ ID NO: 860, SEQ ID NO: 866, SEQ ID NO: 872, SEQ ID NO: 878, SEQ ID NO: 884, SEQ ID NO: 890, SEQ ID NO: 896, SEQ ID NO: 902, SEQ ID NO: 908, SEQ ID NO: 914, SEQ ID NO: 920, SEQ ID NO: 926, SEQ ID NO: 932, SEQ ID NO: 938, SEQ ID NO: 944, SEQ ID NO: 950, SEQ ID NO: 956, SEQ ID NO: 962, SEQ ID NO: 968, SEQ ID NO: 974, SEQ ID NO: 980, SEQ ID NO: 986, SEQ ID NO: 992, SEQ ID NO: 998, SEQ ID NO: 1004, SEQ ID NO: 1010, SEQ ID NO: 1016, SEQ ID NO: 1022, SEQ ID NO: 1028, SEQ ID NO: 1034, SEQ ID NO: 1040, SEQ ID NO: 1046, SEQ ID NO: 1052, SEQ ID NO: 1058, SEQ ID NO: 1064, SEQ ID NO: 1070, SEQ ID NO: 1076, SEQ ID NO: 1082, SEQ ID NO: 1088, SEQ ID NO: 1094, SEQ ID NO: 1100, SEQ ID NO: 1106, SEQ ID NO: 1112, SEQ ID NO: 1118, SEQ ID NO: 1124, SEQ ID NO: 1130, SEQ ID NO: 1136, SEQ ID NO: 1142, SEQ ID NO: 1148, SEQ ID NO: 1154, SEQ ID NO: 1160, SEQ ID NO: 1166, SEQ ID NO: 1172, SEQ ID NO: 1178, SEQ ID NO: 1184, SEQ ID NO: 1190, SEQ ID NO: 1196, SEQ ID NO: 1202, SEQ ID NO: 1208, SEQ ID NO: 1214, SEQ ID NO: 1220, SEQ ID NO: 1226, SEQ ID NO: 1232, SEQ ID NO: 1238, SEQ ID NO: 1244, SEQ ID NO: 1250, SEQ ID NO: 1256, SEQ ID NO: 1262, SEQ ID NO: 1268, SEQ ID NO: 1274, SEQ ID NO: 1280, SEQ ID NO: 1286, SEQ ID NO: 1292, SEQ ID NO: 1298, SEQ ID NO: 1304, SEQ ID NO: 1310, SEQ ID NO: 1316, SEQ ID NO: 1322, SEQ ID NO: 1328, SEQ ID NO: 1334, SEQ ID NO: 1340, SEQ ID NO: 1346, SEQ ID NO: 1352, SEQ ID NO: 1358, SEQ ID NO: 1364, SEQ ID NO:

1370, SEQ ID NO: 1376, SEQ ID NO: 1382, SEQ ID NO: 1388, SEQ ID NO: 1394, SEQ ID NO: 1400, SEQ ID NO: 1406, SEQ ID NO: 1412, SEQ ID NO: 1418, SEQ ID NO: 1424, SEQ ID NO: 1430, SEQ ID NO: 1436, SEQ ID NO: 1442, SEQ ID NO: 1448, SEQ ID NO: 1454, SEQ ID NO: 1460, SEQ ID NO: 1466, SEQ ID NO: 1472, SEQ ID NO: 1478, SEQ ID NO: 1484, SEQ ID NO: 1490, SEQ ID NO: 1496, SEQ ID NO: 1502, SEQ ID NO: 1508, SEQ ID NO: 1514, SEQ ID NO: 1520, SEQ ID NO: 1594, SEQ ID NO: 1526, SEQ ID NO: 1532, SEQ ID NO: 1538, SEQ ID NO: 1544, SEQ ID NO: 1550, SEQ ID NO: 1556, SEQ ID NO: 1562, SEQ ID NO: 1568, SEQ ID NO: 1574, SEQ ID NO: 1580, or SEQ ID NO: 1586 in Figure 3A, 3B, or 3C; (c) a heavy chain CDR3 comprising the amino acid sequence of any one of the HCDR3s in SEQ ID NO: 399, SEQ ID NO: 405, SEQ ID NO: 411, SEQ ID NO: 417, SEQ ID NO: 423, SEQ ID NO: 429, SEQ ID NO: 435, SEQ ID NO: 441, SEQ ID NO: 447, SEQ ID NO: 453, SEQ ID NO: 459, SEQ ID NO: 465, SEQ ID NO: 471, SEQ ID NO: 477, SEQ ID NO: 483, SEQ ID NO: 489, SEQ ID NO: 495, SEQ ID NO: 501, SEQ ID NO: 507, SEQ ID NO: 513, SEQ ID NO: 519, SEQ ID NO: 525, SEQ ID NO: 531, SEQ ID NO: 537, SEQ ID NO: 543, SEQ ID NO: 549, SEQ ID NO: 555, SEQ ID NO: 561, SEQ ID NO: 567, SEQ ID NO: 573, SEQ ID NO: 579, SEQ ID NO: 585, SEQ ID NO: 591, SEQ ID NO: 597, SEQ ID NO: 603, SEQ ID NO: 609, SEQ ID NO: 615, SEQ ID NO: 621, SEQ ID NO: 627, SEQ ID NO: 633, SEQ ID NO: 639, SEQ ID NO: 645, SEQ ID NO: 651, SEQ ID NO: 657, SEQ ID NO: 663, SEQ ID NO: 669, SEQ ID NO: 675, SEQ ID NO: 681, SEQ ID NO: 687, SEQ ID NO: 693, SEQ ID NO: 699, SEQ ID NO: 705, SEQ ID NO: 711, SEQ ID NO: 717, SEQ ID NO: 723, SEQ ID NO: 729, SEQ ID NO: 735, SEQ ID NO: 741, SEQ ID NO: 747, SEQ ID NO: 753, SEQ ID NO: 759, SEQ ID NO: 765, SEQ ID NO: 771, SEQ ID NO: 777, SEQ ID NO: 783, SEQ ID NO: 789, SEQ ID NO: 795, SEQ ID NO: 801, SEQ ID NO: 807, SEQ ID NO: 813, SEQ ID NO: 819, SEQ ID NO: 825, SEQ ID NO: 831, SEQ ID NO: 837, SEQ ID NO: 843, SEQ ID NO: 849, SEQ ID NO: 855, SEQ ID NO: 861, SEQ ID NO: 867, SEQ ID NO: 873, SEQ ID NO: 879, SEQ ID NO: 885, SEQ ID NO: 891, SEQ ID NO: 897, SEQ ID NO: 903, SEQ ID NO: 909, SEQ ID NO: 915, SEQ ID NO: 921, SEQ ID NO: 927, SEQ ID NO: 933, SEQ ID NO: 939, SEQ ID NO: 945, SEQ ID NO: 951, SEQ ID NO: 957, SEQ ID NO: 963, SEQ ID NO: 969, SEQ ID NO: 975, SEQ ID NO: 981, SEQ ID NO: 987, SEQ ID NO: 993, SEQ ID NO: 999, SEQ ID NO: 1005, SEQ ID NO: 1011, SEQ ID

NO: 1017, SEQ ID NO: 1023, SEQ ID NO: 1029, SEQ ID NO: 1035, SEQ ID NO: 1041, SEQ ID NO: 1047, SEQ ID NO: 1053, SEQ ID NO: 1059, SEQ ID NO: 1065, SEQ ID NO: 1071, SEQ ID NO: 1077, SEQ ID NO: 1083, SEQ ID NO: 1089, SEQ ID NO: 1095, SEQ ID NO: 1101, SEQ ID NO: 1107, SEQ ID NO: 1113, SEQ ID NO: 1119, SEQ ID NO: 1125, SEQ ID NO: 1131, SEQ ID NO: 1137, SEQ ID NO: 1143, SEQ ID NO: 1149, SEQ ID NO: 1155, SEQ ID NO: 1161, SEQ ID NO: 1167, SEQ ID NO: 1173, SEQ ID NO: 1179, SEQ ID NO: 1185, SEQ ID NO: 1191, SEQ ID NO: 1197, SEQ ID NO: 1203, SEQ ID NO: 1209, SEQ ID NO: 1215, SEQ ID NO: 1221, SEQ ID NO: 1227, SEQ ID NO: 1233, SEQ ID NO: 1239, SEQ ID NO: 1245, SEQ ID NO: 1251, SEQ ID NO: 1257, SEQ ID NO: 1263, SEQ ID NO: 1269, SEQ ID NO: 1275, SEQ ID NO: 1281, SEQ ID NO: 1287, SEQ ID NO: 1293, SEQ ID NO: 1299, SEQ ID NO: 1305, SEQ ID NO: 1311, SEQ ID NO: 1317, SEQ ID NO: 1323, SEQ ID NO: 1329, SEQ ID NO: 1335, SEQ ID NO: 1341, SEQ ID NO: 1347, SEQ ID NO: 1353, SEQ ID NO: 1359, SEQ ID NO: 1365, SEQ ID NO: 1371, SEQ ID NO: 1377, SEQ ID NO: 1383, SEQ ID NO: 1389, SEQ ID NO: 1395, SEQ ID NO: 1401, SEQ ID NO: 1407, SEQ ID NO: 1413, SEQ ID NO: 1419, SEQ ID NO: 1425, SEQ ID NO: 1431, SEQ ID NO: 1437, SEQ ID NO: 1443, SEQ ID NO: 1449, SEQ ID NO: 1455, SEQ ID NO: 1461, SEQ ID NO: 1467, SEQ ID NO: 1473, SEQ ID NO: 1479, SEQ ID NO: 1485, SEQ ID NO: 1491, SEQ ID NO: 1497, SEQ ID NO: 1503, SEQ ID NO: 1509, SEQ ID NO: 1515, SEQ ID NO: 1521, SEQ ID NO: 1595, SEQ ID NO: 1527, SEQ ID NO: 1533, SEQ ID NO: 1539, SEQ ID NO: 1545, SEQ ID NO: 1551, SEQ ID NO: 1557, SEQ ID NO: 1563, SEQ ID NO: 1569, SEQ ID NO: 1575, SEQ ID NO: 1581, or SEQ ID NO: 1587 in Figure 3A, 3B, or 3C; (d) a light chain CDR1 comprising the amino acid sequence of any one of the LCDR1s in SEQ ID NO: 400, SEQ ID NO: 406, SEQ ID NO: 412, SEQ ID NO: 418, SEQ ID NO: 424, SEQ ID NO: 430, SEQ ID NO: 436, SEQ ID NO: 442, SEQ ID NO: 448, SEQ ID NO: 454, SEQ ID NO: 460, SEQ ID NO: 466, SEQ ID NO: 472, SEQ ID NO: 478, SEQ ID NO: 484, SEQ ID NO: 490, SEQ ID NO: 496, SEQ ID NO: 502, SEQ ID NO: 508, SEQ ID NO: 514, SEQ ID NO: 520, SEQ ID NO: 526, SEQ ID NO: 532, SEQ ID NO: 538, SEQ ID NO: 544, SEQ ID NO: 550, SEQ ID NO: 556, SEQ ID NO: 562, SEQ ID NO: 568, SEQ ID NO: 574, SEQ ID NO: 580, SEQ ID NO: 586, SEQ ID NO: 592, SEQ ID NO: 598, SEQ ID NO: 604, SEQ ID NO: 610, SEQ ID NO: 616, SEQ ID NO: 622, SEQ ID NO: 628, SEQ ID NO: 634,

SEQ ID NO: 640, SEQ ID NO: 646, SEQ ID NO: 652, SEQ ID NO: 658, SEQ ID NO: 664, SEQ ID NO: 670, SEQ ID NO: 676, SEQ ID NO: 682, SEQ ID NO: 688, SEQ ID NO: 694, SEQ ID NO: 700, SEQ ID NO: 706, SEQ ID NO: 712, SEQ ID NO: 718, SEQ ID NO: 724, SEQ ID NO: 730, SEQ ID NO: 736, SEQ ID NO: 742, SEQ ID NO: 748, SEQ ID NO: 754, SEQ ID NO: 760, SEQ ID NO: 766, SEQ ID NO: 772, SEQ ID NO: 778, SEQ ID NO: 784, SEQ ID NO: 790, SEQ ID NO: 796, SEQ ID NO: 802, SEQ ID NO: 808, SEQ ID NO: 814, SEQ ID NO: 820, SEQ ID NO: 826, SEQ ID NO: 832, SEQ ID NO: 838, SEQ ID NO: 844, SEQ ID NO: 850, SEQ ID NO: 856, SEQ ID NO: 862, SEQ ID NO: 868, SEQ ID NO: 874, SEQ ID NO: 880, SEQ ID NO: 886, SEQ ID NO: 892, SEQ ID NO: 898, SEQ ID NO: 904, SEQ ID NO: 910, SEQ ID NO: 916, SEQ ID NO: 922, SEQ ID NO: 928, SEQ ID NO: 934, SEQ ID NO: 940, SEQ ID NO: 946, SEQ ID NO: 952, SEQ ID NO: 958, SEQ ID NO: 964, SEQ ID NO: 970, SEQ ID NO: 976, SEQ ID NO: 982, SEQ ID NO: 988, SEQ ID NO: 994, SEQ ID NO: 1000, SEQ ID NO: 1006, SEQ ID NO: 1012, SEQ ID NO: 1018, SEQ ID NO: 1024, SEQ ID NO: 1030, SEQ ID NO: 1036, SEQ ID NO: 1042, SEQ ID NO: 1048, SEQ ID NO: 1054, SEQ ID NO: 1060, SEQ ID NO: 1066, SEQ ID NO: 1072, SEQ ID NO: 1078, SEQ ID NO: 1084, SEQ ID NO: 1090, SEQ ID NO: 1096, SEQ ID NO: 1102, SEQ ID NO: 1108, SEQ ID NO: 1114, SEQ ID NO: 1120, SEQ ID NO: 1126, SEQ ID NO: 1132, SEQ ID NO: 1138, SEQ ID NO: 1144, SEQ ID NO: 1150, SEQ ID NO: 1156, SEQ ID NO: 1162, SEQ ID NO: 1168, SEQ ID NO: 1174, SEQ ID NO: 1180, SEQ ID NO: 1186, SEQ ID NO: 1192, SEQ ID NO: 1198, SEQ ID NO: 1204, SEQ ID NO: 1210, SEQ ID NO: 1216, SEQ ID NO: 1222, SEQ ID NO: 1228, SEQ ID NO: 1234, SEQ ID NO: 1240, SEQ ID NO: 1246, SEQ ID NO: 1252, SEQ ID NO: 1258, SEQ ID NO: 1264, SEQ ID NO: 1270, SEQ ID NO: 1276, SEQ ID NO: 1282, SEQ ID NO: 1288, SEQ ID NO: 1294, SEQ ID NO: 1300, SEQ ID NO: 1306, SEQ ID NO: 1312, SEQ ID NO: 1318, SEQ ID NO: 1324, SEQ ID NO: 1330, SEQ ID NO: 1336, SEQ ID NO: 1342, SEQ ID NO: 1348, SEQ ID NO: 1354, SEQ ID NO: 1360, SEQ ID NO: 1366, SEQ ID NO: 1372, SEQ ID NO: 1378, SEQ ID NO: 1384, SEQ ID NO: 1390, SEQ ID NO: 1396, SEQ ID NO: 1402, SEQ ID NO: 1408, SEQ ID NO: 1414, SEQ ID NO: 1420, SEQ ID NO: 1426, SEQ ID NO: 1432, SEQ ID NO: 1438, SEQ ID NO: 1444, SEQ ID NO: 1450. SEQ ID NO: 1456, SEQ ID NO: 1462, SEQ ID NO: 1468, SEQ ID NO: 1474, SEQ ID NO: 1480, SEQ ID NO: 1486, SEQ ID NO: 1492, SEQ ID NO: 1498,

SEQ ID NO: 1504, SEQ ID NO: 1510, SEQ ID NO: 1516, SEQ ID NO: 1522, SEQ ID NO: 1596, SEQ ID NO: 1528, SEQ ID NO: 1534, SEQ ID NO: 1540, SEQ ID NO: 1546, SEQ ID NO: 1552, SEQ ID NO: 1558, SEQ ID NO: 1564, SEQ ID NO: 1570, SEQ ID NO: 1576, SEQ ID NO: 1582, or SEQ ID NO: 1588 in Figure 3A, 3B, or 3C; (e) a light chain CDR2 comprising the amino acid sequence of any one of the LCDR2s in SEQ ID NO: 401, SEQ ID NO: 407, SEQ ID NO: 413, SEQ ID NO: 419, SEQ ID NO: 425, SEQ ID NO: 431, SEQ ID NO: 437, SEQ ID NO: 443, SEQ ID NO: 449, SEQ ID NO: 455, SEQ ID NO: 461, SEQ ID NO: 467, SEQ ID NO: 473, SEQ ID NO: 479, SEQ ID NO: 485, SEQ ID NO: 491, SEQ ID NO: 497, SEQ ID NO: 503, SEQ ID NO: 509, SEQ ID NO: 515, SEQ ID NO: 521, SEQ ID NO: 527, SEQ ID NO: 533, SEQ ID NO: 539, SEQ ID NO: 545, SEQ ID NO: 551, SEQ ID NO: 557, SEQ ID NO: 563, SEQ ID NO: 569, SEQ ID NO: 575, SEQ ID NO: 581, SEQ ID NO: 587, SEQ ID NO: 593, SEQ ID NO: 599, SEQ ID NO: 605, SEQ ID NO: 611, SEQ ID NO: 617, SEQ ID NO: 623, SEQ ID NO: 629, SEQ ID NO: 635, SEQ ID NO: 641, SEQ ID NO: 647, SEQ ID NO: 653, SEQ ID NO: 659, SEQ ID NO: 665, SEQ ID NO: 671, SEQ ID NO: 677, SEQ ID NO: 683, SEQ ID NO: 689, SEQ ID NO: 695, SEQ ID NO: 701, SEQ ID NO: 707, SEQ ID NO: 713, SEQ ID NO: 719, SEQ ID NO: 725, SEQ ID NO: 731, SEQ ID NO: 737, SEQ ID NO: 743, SEQ ID NO: 749, SEQ ID NO: 755, SEQ ID NO: 761, SEQ ID NO: 767, SEQ ID NO: 773, SEQ ID NO: 779, SEQ ID NO: 785, SEQ ID NO: 791, SEQ ID NO: 797, SEQ ID NO: 803, SEQ ID NO: 809, SEQ ID NO: 815, SEQ ID NO: 821, SEQ ID NO: 827, SEQ ID NO: 833, SEQ ID NO: 839, SEQ ID NO: 845, SEQ ID NO: 851, SEQ ID NO: 857, SEQ ID NO: 863, SEQ ID NO: 869, SEQ ID NO: 875, SEQ ID NO: 881, SEQ ID NO: 887, SEQ ID NO: 893, SEQ ID NO: 899, SEQ ID NO: 905, SEQ ID NO: 911, SEQ ID NO: 917, SEQ ID NO: 923, SEQ ID NO: 929, SEQ ID NO: 935, SEQ ID NO: 941, SEQ ID NO: 947, SEQ ID NO: 953, SEQ ID NO: 959, SEQ ID NO: 965, SEQ ID NO: 971, SEQ ID NO: 977, SEQ ID NO: 983, SEQ ID NO: 989, SEQ ID NO: 995, SEQ ID NO: 1001, SEQ ID NO: 1007, SEQ ID NO: 1013, SEQ ID NO: 1019, SEQ ID NO: 1025, SEQ ID NO: 1031, SEQ ID NO: 1037, SEQ ID NO: 1043, SEQ ID NO: 1049, SEQ ID NO: 1055, SEQ ID NO: 1061, SEQ ID NO: 1067, SEQ ID NO: 1073, SEQ ID NO: 1079, SEQ ID NO: 1085, SEQ ID NO: 1091, SEQ ID NO: 1097, SEQ ID NO: 1103, SEQ ID NO: 1109, SEQ ID NO: 1115, SEQ ID NO: 1121, SEQ ID NO: 1127, SEQ ID NO: 1133, SEQ ID NO: 1139, SEQ ID NO:

1145, SEQ ID NO: 1151, SEQ ID NO: 1157, SEQ ID NO: 1163, SEQ ID NO: 1169, SEQ ID NO: 1175, SEQ ID NO: 1181, SEQ ID NO: 1187, SEQ ID NO: 1193, SEQ ID NO: 1199, SEQ ID NO: 1205, SEQ ID NO: 1211, SEQ ID NO: 1217, SEQ ID NO: 1223, SEQ ID NO: 1229, SEQ ID NO: 1235, SEQ ID NO: 1241, SEQ ID NO: 1247, SEQ ID NO: 1253, SEQ ID NO: 1259, SEQ ID NO: 1265, SEQ ID NO: 1271, SEQ ID NO: 1277, SEQ ID NO: 1283, SEQ ID NO: 1289, SEQ ID NO: 1295, SEQ ID NO: 1301, SEQ ID NO: 1307, SEQ ID NO: 1313, SEQ ID NO: 1319, SEQ ID NO: 1325, SEQ ID NO: 1331, SEQ ID NO: 1337, SEQ ID NO: 1343, SEQ ID NO: 1349, SEQ ID NO: 1355, SEQ ID NO: 1361, SEQ ID NO: 1367, SEQ ID NO: 1373, SEQ ID NO: 1379, SEQ ID NO: 1385, SEQ ID NO: 1391, SEQ ID NO: 1397, SEQ ID NO: 1403, SEQ ID NO: 1409, SEQ ID NO: 1415, SEQ ID NO: 1421, SEQ ID NO: 1427, SEQ ID NO: 1433, SEQ ID NO: 1439, SEQ ID NO: 1445, SEQ ID NO: 1451, SEQ ID NO: 1457, SEQ ID NO: 1463, SEQ ID NO: 1469, SEQ ID NO: 1475, SEQ ID NO: 1481, SEQ ID NO: 1487, SEQ ID NO: 1493, SEQ ID NO: 1499, SEQ ID NO: 1505, SEQ ID NO: 1511, SEQ ID NO: 1517, SEQ ID NO: 1523, SEQ ID NO: 1597, SEQ ID NO: 1529, SEQ ID NO: 1535, SEQ ID NO: 1541, SEQ ID NO: 1547, SEQ ID NO: 1553, SEQ ID NO: 1559, SEQ ID NO: 1565, SEQ ID NO: 1571, SEQ ID NO: 1577, SEQ ID NO: 1583, or SEQ ID NO: 1589 in Figure 3A, 3B, or 3C; and (f) a light chain CDR3 comprising the amino acid sequence of any one of the LCDR3s in SEQ ID NO: 402, SEQ ID NO: 408, SEQ ID NO: 414, SEQ ID NO: 420, SEQ ID NO: 426, SEQ ID NO: 432, SEQ ID NO: 438, SEQ ID NO: 444, SEQ ID NO: 450, SEQ ID NO: 456, SEQ ID NO: 462, SEQ ID NO: 468, SEQ ID NO: 474, SEQ ID NO: 480, SEQ ID NO: 486, SEQ ID NO: 492, SEQ ID NO: 498, SEQ ID NO: 504, SEQ ID NO: 510, SEQ ID NO: 516, SEQ ID NO: 522, SEQ ID NO: 528, SEQ ID NO: 534, SEQ ID NO: 540, SEQ ID NO: 546, SEQ ID NO: 552, SEQ ID NO: 558, SEQ ID NO: 564, SEQ ID NO: 570, SEQ ID NO: 576, SEQ ID NO: 582, SEQ ID NO: 588, SEQ ID NO: 594, SEQ ID NO: 600, SEQ ID NO: 606, SEQ ID NO: 612, SEQ ID NO: 618, SEQ ID NO: 624, SEQ ID NO: 630, SEQ ID NO: 636, SEQ ID NO: 642, SEQ ID NO: 648, SEQ ID NO: 654, SEQ ID NO: 660, SEQ ID NO: 666, SEQ ID NO: 672, SEQ ID NO: 678, SEQ ID NO: 684, SEQ ID NO: 690, SEQ ID NO: 696, SEQ ID NO: 702, SEQ ID NO: 708, SEQ ID NO: 714, SEQ ID NO: 720, SEQ ID NO: 726, SEQ ID NO: 732, SEQ ID NO: 738, SEQ ID NO: 744, SEQ ID NO: 750, SEQ ID NO: 756, SEQ ID NO: 762, SEQ ID NO: 768, SEQ ID NO:

774, SEQ ID NO: 780, SEQ ID NO: 786, SEQ ID NO: 792, SEQ ID NO: 798, SEQ ID NO: 804, SEQ ID NO: 810, SEQ ID NO: 816, SEQ ID NO: 822, SEQ ID NO: 828, SEQ ID NO: 834, SEQ ID NO: 840, SEQ ID NO: 846, SEQ ID NO: 852, SEQ ID NO: 858, SEQ ID NO: 864, SEQ ID NO: 870, SEQ ID NO: 876, SEQ ID NO: 882, SEQ ID NO: 888, SEQ ID NO: 894, SEQ ID NO: 900, SEQ ID NO: 906, SEQ ID NO: 912, SEQ ID NO: 918, SEQ ID NO: 924, SEQ ID NO: 930, SEQ ID NO: 936, SEQ ID NO: 942, SEQ ID NO: 948, SEQ ID NO: 954, SEQ ID NO: 960, SEQ ID NO: 966, SEQ ID NO: 972, SEQ ID NO: 978, SEQ ID NO: 984, SEQ ID NO: 990, SEQ ID NO: 996, SEQ ID NO: 1002, SEQ ID NO: 1008, SEQ ID NO: 1014, SEQ ID NO: 1020, SEQ ID NO: 1026, SEQ ID NO: 1032, SEQ ID NO: 1038, SEQ ID NO: 1044, SEQ ID NO: 1050, SEQ ID NO: 1056, SEQ ID NO: 1062, SEQ ID NO: 1068, SEQ ID NO: 1074, SEQ ID NO: 1080, SEQ ID NO: 1086, SEQ ID NO: 1092, SEQ ID NO: 1098, SEQ ID NO: 1104, SEQ ID NO: 1110, SEQ ID NO: 1116, SEQ ID NO: 1122, SEQ ID NO: 1128, SEQ ID NO: 1134, SEQ ID NO: 1140, SEQ ID NO: 1146, SEQ ID NO: 1152, SEQ ID NO: 1158, SEQ ID NO: 1164, SEQ ID NO: 1170, SEQ ID NO: 1176, SEQ ID NO: 1182, SEQ ID NO: 1188, SEQ ID NO: 1194, SEQ ID NO: 1200, SEQ ID NO: 1206, SEQ ID NO: 1212, SEQ ID NO: 1218, SEQ ID NO: 1224, SEQ ID NO: 1230, SEQ ID NO: 1236, SEQ ID NO: 1242, SEQ ID NO: 1248, SEQ ID NO: 1254, SEQ ID NO: 1260, SEQ ID NO: 1266, SEQ ID NO: 1272, SEQ ID NO: 1278, SEQ ID NO: 1284, SEQ ID NO: 1290, SEQ ID NO: 1296, SEQ ID NO: 1302, SEQ ID NO: 1308, SEQ ID NO: 1314, SEQ ID NO: 1320, SEQ ID NO: 1326, SEQ ID NO: 1332, SEQ ID NO: 1338, SEQ ID NO: 1344, SEQ ID NO: 1350, SEQ ID NO: 1356, SEQ ID NO: 1362, SEQ ID NO: 1368, SEQ ID NO: 1374, SEQ ID NO: 1380, SEQ ID NO: 1386, SEQ ID NO: 1392, SEQ ID NO: 1398, SEQ ID NO: 1404, SEQ ID NO: 1410, SEQ ID NO: 1416, SEQ ID NO: 1422, SEQ ID NO: 1428, SEQ ID NO: 1434, SEQ ID NO: 1440, SEQ ID NO: 1446, SEQ ID NO: 1452, SEQ ID NO: 1458, SEQ ID NO: 1464, SEQ ID NO: 1470, SEQ ID NO: 1476, SEQ ID NO: 1482, SEQ ID NO: 1488, SEQ ID NO: 1494, SEQ ID NO: 1500, SEQ ID NO: 1506, SEQ ID NO: 1512, SEQ ID NO: 1518, SEQ ID NO: 1524, SEQ ID NO: 1598, SEQ ID NO: 1530, SEQ ID NO: 1536, SEQ ID NO: 1542, SEQ ID NO: 1548, SEQ ID NO: 1554, SEQ ID NO: 1560, SEQ ID NO: 1566, SEQ ID NO: 1572, SEQ ID NO: 1578, SEQ ID NO: 1584, or SEQ ID NO: 1590 in

Figure 3A, 3B, or 3C, wherein the HCDR1, HCDR2, HCDR3, LCDR1, LCDR2, and LCDR3 are from a same clone.

[0018] In some embodiments, an isolated antibody comprises a heavy chain comprising the heavy chain amino acid variable sequence in any one of SEQ ID NO. 1 – SEQ ID NO: 97, SEQ ID NO: 195 – SEQ ID NO: 209, or SEQ ID NO: 225 – SEQ ID NO: 310 in Figures 2A, 2B, or 2C, or a sequence at least 90% identical thereto.

[0019] In some embodiments, an isolated antibody comprises a light chain comprising the light chain amino acid variable sequence in any one of SEQ ID NO: 98 – SEQ ID NO: 194, SEQ ID NO: 210 – SEQ ID NO: 224, or SEQ ID NO: 311 – SEQ ID NO: 396 in Figures 2A, 2B, or 2C, or a sequence at least 90% identical thereto.

[0020] In some embodiments, an isolated antibody comprises a heavy chain comprising the heavy chain amino acid variable sequence in any one of SEQ ID NO. 1 – SEQ ID NO: 97, SEQ ID NO: 195 – SEQ ID NO: 209, or SEQ ID NO: 225 – SEQ ID NO: 310 in Figures 2A, 2B, or 2C, or a sequence at least 90% identical thereto, and a light chain comprising the light chain amino acid variable sequence in any one of SEQ ID NO: 98 – SEQ ID NO: 194, SEQ ID NO: 210 – SEQ ID NO: 224, or SEQ ID NO: 311 – SEQ ID NO: 396 in Figures 2A, 2B, or 2C or a sequence at least 90% identical thereto.

[0021] In some embodiments, a composition comprises an isolated antigen binding molecule or antibody provided herein in an amount that is pharmaceutically acceptable, and a pharmaceutically acceptable carrier.

[0022] In some embodiments, a method of treating a TIGIT related disorder comprises identifying a subject with a TIGIT related disorder, and administering an effective dose of the isolated antigen binding molecule or antibody provided herein to the subject.

[0023] In some embodiments, a method of enhancing T-cell activation comprises diagnosing an individual with low T-cell counts, and administering an effective dose of the isolated antigen binding molecule or isolated antibody provided herein.

[0024] In some embodiments, a method of making an isolated antigen binding molecule that binds to human TIGIT comprises providing a nucleic acid that encodes for the isolated antigen binding molecule or isolated antibody provided herein, and expressing a protein encoded by the nucleic acid.

[0025] In some embodiments, a kit for determining the presence of human TIGIT comprises the isolated antigen binding molecule or isolated antibody provided herein, and a detectable marker.

[0026] In some embodiments, a method of preventing, treating and/or lessening the severity of an immune-related disease relating to aberrant immune cell response in a subject comprises modulating the activity of TIGIT in the subject by administering an effective amount of any one or more of the isolated antigen binding molecules or antibodies provided herein.

[0027] In some embodiments, disclosed herein is a method of increasing or stimulating an immune response by administering in vitro or in vivo an antagonist of TIGIT activity, and/or by inhibiting intracellular signaling mediated by TIGIT binding to PVR (aka CD155), wherein the antagonist of TIGIT activity is any one or more of the isolated antigen binding molecules or isolated antibodies provided herein.

[0028] In some embodiments, a method of increasing T cell activation comprises administering any one or more of the isolated antigen binding molecules or isolated antibodies provided herein to a subject in an amount sufficient to block TIGIT in the subject.

[0029] In some embodiments, a method of treating an infection or infectious disease in a human subject comprises administering to a subject who has an infectious disease an effective amount of the isolated antigen binding molecule or isolated antibody herein.

[0030] In some embodiments, a method for increasing an effectiveness of a vaccine comprises administering a vaccine to a subject, and administering any one or more of the isolated antigen binding molecules or antibodies provided herein to the subject in an amount sufficient to serve as an adjuvant for the vaccine.

[0031] In some embodiments, a method for treating an infection comprises identifying a subject that has a viral infection, a bacterial infection, parasitic infection, and/or a fungal infection, and administering any one or more of the antigen binding molecules or isolated antibodies provided herein to the subject in an amount and for a duration sufficient to treat the viral infection, the bacterial infection, the parasitic infection, and/or the fungal infection.

[0032] In some embodiments, a method for preventing and/or inhibiting TIGIT binding to MHC class II to enhance antigen-specific T-cell activation or stimulating T-cell production of interleukin-2 in a subject comprises administering any one or more of the antigen binding molecules provided herein to a subject in an amount sufficient for preventing and/or inhibiting TIGIT binding to MHC class II in the subject.

[0033] In some embodiments, a method of preventing, treating and/or lessening the severity of a disease in a subject comprises modulating the activity of TIGIT in the subject by administering an effective amount of any one or more of the isolated antigen binding molecules or isolated antibody provided herein, wherein the disease is selected from the group consisting of: systemic lupus erythematosis, rheumatoid arthritis, juvenile chronic arthritis, spondyloarthropathies, systemic sclerosis (scleroderma), idiopathic inflammatory myopathies (dermatomyositis, polymyositis), Sjogren's syndrome, systemic vasculitis, sarcoidosis, autoimmune hemolytic anemia (immune pancytopenia, paroxysmal nocturnal hemoglobinuria), autoimmune thrombocytopenia (idiopathic thrombocytopenic purpura, immune-mediated thrombocytopenia), thyroiditis (Grave's disease, Hashimoto's thyroiditis, juvenile lymphocytic thyroiditis, atrophic thyroiditis), diabetes mellitus, immune-mediated renal disease (glomerulonephritis, tubulointerstitial nephritis), demyelinating diseases of the central and peripheral nervous systems such as multiple sclerosis, idiopathic demyelinating polyneuropathy or Guillain-Barre syndrome, and chronic inflammatory demyelinating polyneuropathy, hepatobiliary diseases such as infectious hepatitis (hepatitis A, B, C, D, E and other non-hepatotropic viruses), autoimmune chronic active hepatitis, primary biliary cirrhosis, granulomatous hepatitis, and sclerosing cholangitis, inflammatory bowel disorder (IBD) (ulcerative colitis: Crohn's disease), gluten-sensitive enteropathy, and Whipple's disease, autoimmune or immune-mediated skin diseases including bullous skin diseases, erythema multiforme and contact dermatitis, psoriasis, allergic diseases such as asthma, allergic rhinitis, atopic dermatitis, food hypersensitivity and urticaria, immunologic diseases of the lung such as eosinophilic pneumonias, idiopathic pulmonary fibrosis and hypersensitivity pneumonitis, transplantation associated diseases including graft rejection and graft-versus-host-disease. Infectious diseases including viral diseases such as AIDS (HIV infection), hepatitis A, B, C, D, and E, herpes, etc., bacterial infections, fungal infections,

protozoal infections and parasitic infections also may have immune and/or inflammatory components and/or etiology.

[0034] In some embodiments, an isolated antigen binding molecule that binds to human TIGIT comprises at least one of: (a) (i) a heavy chain variable region comprising the heavy chain of clone Ab117 (SEQ ID NO: 62) and (ii) a light chain variable region comprising the light chain of clone Ab117 (SEQ ID NO: 159); (b) (i) a heavy chain variable region comprising the heavy chain of clone Ab53 (SEQ ID NO: 199) and (ii) a light chain variable region comprising the light chain of clone Ab53 (SEQ ID NO: 214); (c) (i) a heavy chain variable region comprising the heavy chain of clone Ab40 (SEQ ID NO: 200) and (ii) a light chain variable region comprising the light chain of clone Ab40 (SEQ ID NO: 215); (d) (i) a heavy chain variable region comprising the heavy chain of clone Ab48 (SEQ ID NO: 203) and (ii) a light chain variable region comprising the light chain of clone Ab48 (SEQ ID NO: 218); (e) (i) a heavy chain variable region comprising the heavy chain of clone Ab1 (SEQ ID NO: 299) and (ii) a light chain variable region comprising the light chain of clone Ab1 (SEQ ID NO: 385); or (f) (i) a heavy chain variable region comprising the heavy chain of clone Ab143 (SEQ ID NO: 279) and (ii) a light chain variable region comprising the light chain of clone Ab143 (SEQ ID NO: 365).

BRIEF DESCRIPTION OF THE DRAWINGS

[0035] Figure 1 depicts an alignment of various TIGIT sequences.

[0036] Figures 2A-2C depict embodiments of various anti-TIGIT antigen binding molecule sequences.

[0037] Figures 3A-3C depict embodiments of various anti-TIGIT antigen binding molecule sequences.

[0038] Figure 4 depicts embodiments of various TIGIT sequences.

[0039] Figure 5 shows embodiments of sequences of heavy chain CDRs of antigen binding molecules.

DETAILED DESCRIPTION

[0040] Provided herein are antigen binding molecules that bind to the TIGIT protein, preferably, the human TIGIT human protein. Figure 1 depicts a sequence alignment

of various forms of TIGIT, including the human TIGIT. Some embodiments of the antigen binding molecules are applicable for diagnostic purposes. In some embodiments, the antigen binding molecules are antibodies or antigen binding fragments thereof. In some embodiments, the antigen binding molecules are agonists, and thereby activate or increase TIGIT mediated signaling. In some embodiments, the antigen binding molecules are antagonists, and thereby inhibit or decrease TIGIT mediated signaling. The following description provides an initial outline of abbreviations and definitions, followed by a set of preferred embodiments and examples.

Abbreviations

[0041] Throughout the detailed description and examples the following abbreviations will be used:

ADCC:	Antibody-dependent cellular cytotoxicity
CDC:	Complement-dependent cytotoxicity
CDR:	Complementarity determining region in the immunoglobulin variable regions
CHO:	Chinese hamster ovary
FR:	Antibody framework region: the immunoglobulin variable regions excluding the CDR regions.
IC50:	concentration resulting in 50% inhibition
IgG:	Immunoglobulin G
mAb or Mab or MAb:	Monoclonal antibody
V region:	The segment of IgG chains which is variable in sequence between different antibodies. It extends to Kabat residue 109 in the light chain and 113 in the heavy chain.
VH:	Immunoglobulin heavy chain variable region
VK:	Immunoglobulin kappa light chain variable region

Definitions

[0042] So that the various embodiments may be more readily understood, certain technical and scientific terms are specifically defined below. Unless specifically defined elsewhere in this document, all other technical and scientific terms used herein have the meaning commonly understood by one of ordinary skill in the art to which this invention belongs.

[0043] As used herein, including the appended claims, the singular forms of words such as "a," "an," and "the," include their corresponding plural references unless the context clearly dictates otherwise.

[0044] "Administration" as it applies to an animal, human, experimental subject, cell, tissue, organ, or biological fluid, refers to contact of an exogenous pharmaceutical, therapeutic, diagnostic agent, or composition to the animal, human, subject, cell, tissue, organ, or biological fluid. "Administration" also means in vitro and ex vivo treatments, e.g., of a cell, by a reagent, diagnostic, binding compound, or by another cell. Administration can be of the antibody directly to th subject. Administration can be via a vector or other approach as well (administering nucleic acid that encodes the antibody).

[0045] "Treat", "treating", or "treatment" means to administer a therapeutic agent, such as a composition containing any of the antibodies or antigen-binding fragments provided herein, internally or externally to a subject or patient having one or more disease symptoms, or being suspected of having a disease, for which the agent has therapeutic activity. Typically, the agent is administered in an amount effective to alleviate one or more disease symptoms in the treated subject or population, whether by inducing the regression of or inhibiting the progression of such symptom(s) by any clinically measurable degree. The amount of a therapeutic agent that is effective to alleviate any particular disease symptom may vary according to factors such as the disease state, age, and weight of the patient, and the ability of the drug to elicit a desired response in the subject. Whether a disease symptom has been alleviated can be assessed by any clinical measurement typically used by physicians or other skilled healthcare providers to assess the severity or progression status of that symptom. "Treatment" refers to both therapeutic treatment and prophylactic or preventative measures, wherein the object is to prevent or slow down (lessen) the targeted pathologic

condition or disorder. Those in need of treatment include those already with the disorder as well as those prone to have the disorder or those in whom the disorder is to be prevented.

[0046] "Mammal" for purposes of treatment refers to any animal classified as a mammal, including humans, domestic and farm animals, and zoo, sports, or pet animals, such as dogs, cats, cattle, horses, sheep, pigs, goats, rabbits, etc. Preferably, the mammal is human.

[0047] Administration "in combination with" one or more further therapeutic agents includes simultaneous (concurrent) and consecutive administration in any order.

[0048] "Carriers" as used herein include pharmaceutically acceptable carriers, excipients, or stabilizers which are nontoxic to the cell or mammal being exposed thereto at the dosages and concentrations employed. Often the physiologically acceptable carrier is an aqueous pH buffered solution. Examples of physiologically acceptable carriers include buffers such as phosphate, citrate, and other organic acids; antioxidants including ascorbic acid; low molecular weight (less than about 10 residues) polypeptide; proteins, such as serum albumin, gelatin, or immunoglobulins; hydrophilic polymers such as polyvinylpyrrolidone; amino acids such as glycine, glutamine, asparagine, arginine or lysine; monosaccharides, disaccharides, and other carbohydrates including glucose, mannose, or dextrins; chelating agents such as EDTA; sugar alcohols such as mannitol or sorbitol; salt-forming counterions such as sodium; and/or nonionic surfactants such as TWEEN™, polyethylene glycol (PEG), and PLURONICS™.

[0049] The term TIGIT includes human TIGIT, cynomolgous monkey TIGIT and rhesus TIGIT as well as fragments thereof such as the mature fragment thereof lacking the signal peptide. In some embodiments, the amino acid sequence of human TIGIT comprises the amino acid sequence disclosed in amino acid residues 25-244 of Genbank Accession Number NP 776160.2 (amino acid residues 1-24 correspond to a leader peptide.) In some embodiments, the amino acid sequence of cynomolgous monkey, e.g., Macaca fascicularis TIGIT comprises the amino acid sequence in Genbank Accession no. XP 005548157. The amino acid sequence of rhesus monkey TIGIT is identical to the amino acid sequence of cynomolgous monkey TIGIT. (Amino acid residues 1-24 correspond to a leader peptide.) Examples of TIGIT sequences are shown in FIG. 1 and FIG. 4. Unless specified otherwise,

the term human TIGIT will denote the first sequence in FIG. 4 (with or without a leader peptide).

[0050] As used herein, the term "antigen binding molecule" includes both antibodies and antigen binding fragments thereof. An antigen binding molecule that binds to TIGIT refers to an antibody or antigen-binding fragment thereof that "specifically" binds to TIGIT. An antigen binding molecule that "specifically" binds to human TIGIT is an antigen binding molecule that binds to human TIGIT with a K_D of about 1 microM or a higher affinity (e.g., 1 micromolar, 0.1 micromolar, 0.01 micromolar, 1 nM-2 pM, 1 nM, 100 pM, 10 pM or 2 pM), but does not bind to other proteins lacking this (or a part thereof) sequence. For example, an antigen binding molecule that "specifically binds" human TIGIT does not bind to human CD226 and human CD155. In some embodiments, the antigen binding molecule that specifically binds to TIGIT can bind to a fragment of a TIGIT protein, as long as it also binds to the native form of TIGIT. Where desired, a full length antibody can be designated as an "intact" antibody (as opposed to an antigen binding fragment of the intact antibody).

[0051] As used herein "cross-reactivity" refers to the ability of an antigen binding molecule to react with a homologous protein from other species. Whether an antigen binding molecule specifically binds to human TIGIT can be determined using any assay known in the art. Examples of assays known in the art to determining binding affinity include surface plasmon resonance (e.g., BIACORE) or a similar technique (e.g. KinExa or OCTET).

[0052] The term "antibody" is used in the broadest sense and specifically covers, for example, single anti-TIGIT monoclonal antibodies or antibodies that specifically bind to any of the other polypeptides described herein (including agonist, antagonist, and neutralizing antibodies), anti-TIGIT or antibody compositions with polyepitopic specificity, single chain anti-TIGIT or other antibodies. The term "monoclonal antibody" as used herein refers to an antibody that is part of a substantially homogeneous collection of antibodies, i.e., the individual antibodies comprising the population are identical except for possible naturally-occurring mutations that may be present in minor amounts.

[0053] Some embodiments provided herein include non-human parental (e.g. mouse and rodent) anti-TIGIT antibodies and antigen-binding fragments thereof and methods

of use thereof. These antibodies may be modified for an intended use, such as humanization of an antibody for use as a human therapeutic antibody or fragment.

[0054] Some embodiments provided herein include anti-TIGIT antigen-binding fragments and methods of use thereof. Examples of antigen-binding fragments include, but are not limited to, Fab, Fab', $F(ab')_2$, and Fv fragments; diabodies; linear antibodies; single-chain antibody molecules, e.g., sc-Fv; nanobodies and multispecific antibodies formed from antibody fragments.

[0055] Some embodiments provided herein include anti-TIGIT Fab fragments and methods of use thereof. A "Fab fragment" is comprised of one light chain and the C_H1 and variable regions of one heavy chain. The heavy chain of a Fab molecule cannot form a disulfide bond with another heavy chain molecule. An "Fab fragment" can be the product of papain cleavage of an antibody.

[0056] Some embodiments provided herein include anti-TIGIT antibodies and antigen-binding fragments thereof which comprise an Fc region and methods of use thereof. An "Fc" region contains two heavy chain fragments comprising the C_H1 and C_H2 domains of an antibody. The two heavy chain fragments are held together by two or more disulfide bonds and by hydrophobic interactions of the C_H3 domains.

[0057] Some embodiments provided herein include anti-TIGIT Fab' fragments and methods of use thereof. A "Fab' fragment" contains one light chain and a portion or fragment of one heavy chain that contains the VHdomain and the C_H1 domain and also the region between the C_H1 and C_H2 domains, such that an interchain disulfide bond can be formed between the two heavy chains of two Fab' fragments to form a F(ab')2molecule. Also contemplated are anti-TIGIT F(ab')2fragments and methods of use thereof. A "F(ab')2fragment" contains two light chains and two heavy chains containing a portion of the constant region between the C_H1 and C_H2 domains, such that an interchain disulfide bond is formed between the two heavy chains. A F(ab')2fragment thus is composed of two Fab' fragments that are held together by a disulfide bond between the two heavy chains. An "F(ab')2fragment" can be the product of pepsin cleavage of an antibody.

[0058] Some embodiments provided herein include anti-TIGIT Fv fragments and methods of use thereof. The "Fv region" comprises the variable regions from both the heavy and light chains, but lacks the constant regions.

[0059] Some embodiments provided herein include anti-TIGIT scFv fragments and methods of use thereof. The term "single-chain Fv" or "scFv" antibody refers to antibody fragments comprising the VH and VL domains of an antibody, wherein these domains are present in a single polypeptide chain. Generally, the Fv polypeptide further comprises a polypeptide linker between the VH and VL domains which enables the scFv to form the desired structure for antigen-binding. For a review of scFv, see Pluckthun (1994) THE PHARMACOLOGY OF MONOCLONAL ANTIBODIES, vol. 113, Rosenburg and Moore eds. Springer- Verlag, New York, pp. 269-315. See also, International Patent Application Publication No. WO 88/01649 and U.S. Pat. Nos. 4,946, 778 and 5,260,203.

[0060] Some embodiments provided herein include a domain antibody. A "domain antibody" is an immunologically functional immunoglobulin fragment containing only the variable region of a heavy chain or the variable region of a light chain. In some instances, two or more V_H regions are covalently joined with a peptide linker to create a bivalent domain antibody. The two V_H regions of a bivalent domain antibody may target the same or different antigens. In some embodiments, surrobody arrangements can also be used with one or more of the CDRs and/or variable chain regions provided herein. Surrobodies include an antibody heavy chain paired with two surrogate light chain components. See, e.g., Xu et al "Combinatorial surrobody libraties" PNAS; 105, 10756-10761, July 29, 2008, and WO2013109994, US20150011736. In somem embodiments, the surrogate light chain can include a VpreB section and a lambda5 section.

[0061] Some embodiments provided herein include a bivalent antibody. A "bivalent antibody" comprises two antigen-binding sites. In some embodiments, the two binding sites have the same antigen specificities. However, bivalent antibodies may be bispecific. Some embodiments provided herein include bispecific antibodies.

[0062] Some embodiments provided herein include anti-TIGIT camelized single domain antibodies and methods of use thereof. In certain embodiments, antibodies herein also include camelized single domain antibodies. See, e.g., Muyldermans et al. (2001) Trends

Biochem. Sci. 26:230; Reichmann et al. (1999) J. Immunol. Methods 231 :25; WO 94/04678; WO 94/25591; U.S. Pat. No. 6,005,079). In some embodiments, single domain antibodies comprising two VH domains with modifications such that single domain antibodies are formed are provided.

[0063] Some embodiments provided herein include anti-TIGIT diabodies and methods of use thereof. As used herein, the term "diabodies" refers to small antibody fragments with two antigen-binding sites, which fragments comprise a heavy chain variable domain (V_H) connected to a light chain variable domain (V_L) in the same polypeptide chain (V_H-V_L or V_L-V_H). By using a linker that is too short to allow pairing between the two domains on the same chain, the domains are forced to pair with the complementary domains of another chain and create two antigen-binding sites. Diabodies are described more fully in, e.g., EP 404,097; WO 93/11161; and Holliger et al. (1993) Proc. Natl. Acad. Sci. USA 90: 6444-6448. For a review of engineered antibody variants generally see Holliger and Hudson (2005) Nat. Biotechnol. 23: 1126-1136.

[0064] Typically, an antigen binding molecule that is modified in some way retains at least 10% of its binding activity (when compared to the parental antibody) when that activity is expressed on a molar basis. Preferably, an antigen binding molecule retains at least 20%, 50%, 70%, 80%, 90%, 95% or 100% or more of the TIGIT binding affinity as the parental antibody. It is also intended that an antigen binding molecule can include conservative or non-conservative amino acid substitutions (referred to as "conservative variants" or "function conserved variants" of the antigen binding molecule) that do not substantially alter its biologic activity.

[0065] Some embodiments provided herein include isolated anti-TIGIT antigen binding molecules and methods of use thereof. "Isolated" antigen binding molecules (e.g., antibodies or antigen-binding fragments thereof) are at least partially free of other biological molecules from the cells or cell cultures in which they are produced. Such biological molecules include nucleic acids, proteins, lipids, carbohydrates, or other material such as cellular debris and growth medium. An isolated antigen binding molecule (e.g., antibody or antigen-binding fragment) may further be at least partially free of expression system components such as biological molecules from a host cell or of the growth medium thereof.

Generally, the term "isolated" is not intended to refer to a complete absence of such biological molecules or to an absence of water, buffers, or salts or to components of a pharmaceutical formulation that includes the antibodies or fragments. In some embodiments, the antigen binding molecule will be purified (1) to greater than 95% by weight of antibody, and most preferably more than 99% by weight or (2) to homogeneity by SDS-PAGE under reducing or nonreducing conditions using a dye or stain such as, but not limited to, Coomassie blue or silver stain. Isolated antibody includes the antibody in situ within recombinant cells since at least one component of the antibody's natural environment will not be present.

[0066] Some embodiments provided herein include anti-TIGIT chimeric antibodies (e.g., human constant domain/mouse variable domain) and methods of use thereof. As used herein, a "chimeric antibody" is an antibody having the variable domain from a first antibody and the constant domain from a second antibody, where the first and second antibodies are from different species. (U.S. Pat. No. 4,816,567; and Morrison et al, (1984) Proc. Natl. Acad. Sci. USA 81 : 6851-6855). Typically, the variable domains are obtained from an antibody from an experimental animal (the "parental antibody"), such as a rodent, and the constant domain sequences are obtained from human antibodies, so that the resulting chimeric antibody will be less likely to elicit an adverse immune response in a human subject than the parental (e.g., mouse) antibody. Some embodiments provided herein include anti-TIGIT human antibodies.

[0067] Some embodiments provided herein include anti-TIGIT humanized antibodies and antigen-binding fragments thereof (e.g., rat or mouse antibodies that have been humanized) and methods of use thereof. As used herein, the term "humanized antibody" refers to forms of antibodies that contain sequences from both human and non-human (e.g. mouse or rat) antibodies. In general, the humanized antibody will comprise substantially all of at least one, and typically two, variable domains, in which all or substantially all of the hypervariable loops correspond to those of a non-human immunoglobulin, and all or substantially all of the framework (FR) regions are those of a human immunoglobulin sequence. The humanized antibody may optionally comprise at least

a portion of a human immunoglobulin constant region (Fc). These options also apply to antigen binding molecules.

[0068] In general, the basic antibody structural unit comprises a tetramer. Each tetramer includes two identical pairs of polypeptide chains, each pair having one "light" (about 25 kDa) and one "heavy" chain (about 50-70 kDa). The amino-terminal portion of each chain includes a variable region of about 100 to 110 or more amino acids primarily responsible for antigen recognition. The carboxy-terminal portion of the heavy chain may define a constant region primarily responsible for effector function. Typically, human light chains are classified as kappa and lambda light chains. Furthermore, human heavy chains are typically classified as mu, delta, gamma, alpha, or epsilon, and define the antibody's isotype as IgM, IgD, IgG, IgA, and IgE, respectively. Within light and heavy chains, the variable and constant regions are joined by a "J" region of about 12 or more amino acids, with the heavy chain also including a "D" region of about 10 more amino acids. See generally, Fundamental Immunology Ch. 7 (Paul, W., ed., 2nd ed. Raven Press, N.Y. (1989).

[0069] The variable regions of each light/heavy chain pair form the antibody binding site. Thus, in general, an intact antibody has two binding sites. Except in bifunctional or bispecific antibodies, the two binding sites are, in general, the same.

[0070] Typically, the variable domains of both the heavy and light chains comprise three hypervariable regions, also called complementarity determining regions (CDRs), located within relatively conserved framework regions (FR). The CDRs are usually aligned by the framework regions, enabling binding to a specific epitope. In general, from N-terminal to C-terminal, both light and heavy chains variable domains comprise FR1, CDR1, FR2, CDR2, FR3, CDR3 and FR4. The assignment of amino acids to each domain is, generally, in accordance with the definitions of Sequences of Proteins of Immunological Interest, Kabat, et al.; National Institutes of Health, Bethesda, Md. ; 5thed.; NIH Publ. No. 91-3242 (1991); Kabat (1978) Adv. Prot. Chem. 32:1-75; Kabat, et al, (1977) J. Biol. Chem. 252:6609-6616; Chothia, et al, (1987) JMol. Biol. 196:901-917 or Chothia, et al., (1989) Nature 342:878-883.

[0071] CDRs (e.g., CDRL1, CDRL2 and CDRL3 in the light chain variable domain and CDRH1, CDRH2 and CDRH3 in the heavy chain variable domain) can also be

identified following Chothia and Lesk (1987) J. Mol. Biol. 196: 901-917 (defining the CDR regions of an antibody by structure). As used herein, the term "framework" or "FR" residues refers to those variable domain residues other than the hypervariable region residues defined herein as CDR residues. Additional CDR delineations are in use and are encompassed herein. The Chothia approach refers to the location of the structural loops (Chothia and Lesk J. Mol. Biol. 196:901-917 (1987)). The AbM CDRs represent a compromise between the Kabat CDRs and Chothia structural loops, and are used by Oxford Molecular's AbM antibody modeling software. The "contact" CDRs are based on an analysis of the available complex crystal structures. The residues from each of these CDRs are noted below.

TABLE 0.1

Loop	Kabat	AbM	Chothia	Contact
L1	L24-L34	L24-L34	L26-L32	L30-L36
L2	L50-L56	L50-L56	L50-L52	L46-L55
L3	L89-L97	L89-L97	L91-L96	L89-L96
H1	H31-H35B	H26-H35B (Kabat Numbering)	H26-H32	H30-H35B
H1	H31-H35	H26-H35 (Chothia Numbering)	H26-H32	H30-H35
H2	H50-H65	H50-H58	H53-H55	H47-H58
H3	H95-H102	H95-H102	H96-H101	H93-H101

[0072] CDRs may comprise "extended CDRs" as follows: 24-36 or 24-34 (L1), 46-56 or 50-56 (L2) and 89-97 or 89-96 (L3) in the VL and 26-35 (H1), 50-65 or 49-65 (H2) and 93-102, 94-102, or 95-102 (H3) in the VH. The variable domain residues are numbered according to Kabat et al., supra, for each of these definitions. As provided herein, any one or more of the above CDR definitions may be used to identify the CDRs of the anti-TIGIT antibody, within any given heavy and/or light chain sequence. Thus, for any antibody chain sequence provided herein, all forms of the CDR collection (all three within the chain) are

contemplated. In some embodiments, the CDR sequences are those provided in FIGs. 3A-3C.

[0073] Depending on the amino acid sequence of the constant domain of their heavy chains, immunoglobulins can be assigned to different classes. There are five major classes of immunoglobulins: IgA, IgD, IgE, IgG, and IgM, and several of these may be further divided into subclasses (isotypes), e.g., IgG1, IgG2, IgG3, IgG4, IgA, and IgA2. In some embodiments, the anti-TIGIT antibody can be any one of these isotypes.

[0074] "Isolated nucleic acid molecule" or "isolated polynucleotide" means a DNA or RNA of genomic, mRNA, cDNA, or synthetic origin or some combination thereof which is not associated with all or a portion of a polynucleotide in which the isolated polynucleotide is found in nature, or is linked to a polynucleotide to which it is not linked in nature. For purposes of this disclosure, it should be understood that "a nucleic acid molecule comprising" a particular nucleotide sequence does not encompass intact chromosomes. Isolated nucleic acid molecules "comprising" specified nucleic acid sequences may include, in addition to the specified sequences, coding sequences for up to ten or even up to twenty or more other proteins or portions or fragments thereof, or may include operably linked regulatory sequences that control expression of the coding region of the recited nucleic acid sequences, and/or may include vector sequences.

[0075] The phrase "control sequences" refers to DNA sequences necessary for the expression of an operably linked coding sequence in a particular host organism. The control sequences that are suitable for prokaryotes, for example, include a promoter, optionally an operator sequence, and a ribosome binding site. Eukaryotic cells are known to use promoters, polyadenylation signals, and enhancers.

[0076] A nucleic acid or polynucleotide is "operably linked" when it is placed into a functional relationship with another nucleic acid sequence. For example, DNA for a presequence or secretory leader is operably linked to DNA for a polypeptide if it is expressed as a preprotein that participates in the secretion of the polypeptide; a promoter or enhancer is operably linked to a coding sequence if it affects the transcription of the sequence; or a ribosome binding site is operably linked to a coding sequence if it is positioned so as to facilitate translation. Generally, but not always, "operably linked" means that the DNA

sequences being linked are contiguous, and, in the case of a secretory leader, contiguous and in reading phase. However, enhancers do not have to be contiguous. Linking is accomplished by ligation at convenient restriction sites. If such sites do not exist, the synthetic oligonucleotide adaptors or linkers are used in accordance with conventional practice.

[0077] As used herein, the expressions "cell," "cell line," and "cell culture" are used interchangeably and all such designations include progeny. Thus, the words "transformants" and "transformed cells" include the primary subject cell and cultures derived therefrom without regard for the number of transfers. It is also understood that not all progeny will have precisely identical DNA content, due to deliberate or inadvertent mutations. Mutant progeny that have the same function or biological activity as screened for in the originally transformed cell are included. Where distinct designations are intended, it will be clear from the context.

[0078] As used herein, "germline sequence" refers to a sequence of unrearranged immunoglobulin DNA sequences. Any suitable source of unrearranged immunoglobulin sequences may be used. Human germline sequences may be obtained, for example, from JOINSOLVER germline databases on the website for the National Institute of Arthritis and Musculoskeletal and Skin Diseases of the United States National Institutes of Health. Mouse germline sequences may be obtained, for example, as described in Giudicelli et al. (2005) Nucleic Acids Res. 33:D256-D261.

[0079] "Stringent conditions" or "high stringency conditions", as defined herein, may be identified by those that: (1) employ low ionic strength and high temperature for washing, for example 0.015 M sodium chloride/0.0015 M sodium citrate/0.1% sodium dodecyl sulfate at 50° C.; (2) employ during hybridization a denaturing agent, such as formamide, for example, 50% (v/v) formamide with 0.1% bovine serum albumin/0.1% Ficoll/0.1% polyvinylpyrrolidone/50 mM sodium phosphate buffer at pH 6.5 with 750 mM sodium chloride, 75 mM sodium citrate at 42° C.; or (3) employ 50% formamide, 5×SSC (0.75 M NaCl, 0.075 M sodium citrate), 50 mM sodium phosphate (pH 6.8), 0.1% sodium pyrophosphate, 5×Denhardt's solution, sonicated salmon sperm DNA (50 microgram/ml), 0.1% SDS, and 10% dextran sulfate at 42°C., with washes at 42°C. in 0.2×SSC (sodium

chloride/sodium citrate) and 50% formamide at 55° C., followed by a high-stringency wash consisting of 0.1×SSC containing EDTA at 55° C.

[0080] "Moderately stringent conditions" may be identified as described by Sambrook et al., Molecular Cloning: A Laboratory Manual, New York: Cold Spring Harbor Press, 1989, and include the use of washing solution and hybridization conditions (e.g., temperature, ionic strength and % SDS) less stringent that those described above. An example of moderately stringent conditions is overnight incubation at 37°C. in a solution comprising: 20% formamide, 5×SSC (150 mM NaCl, 15 mM trisodium citrate), 50 mM sodium phosphate (pH 7.6), 5×Denhardt's solution, 10% dextran sulfate, and 20 mg/ml denatured sheared salmon sperm DNA, followed by washing the filters in 1×SSC at about 37-50° C. The skilled artisan will recognize how to adjust the temperature, ionic strength, etc. as necessary to accommodate factors such as probe length and the like.

[0081] The terms "TIGIT antagonist" and "antagonist of TIGIT activity" are used interchangeably and refer to a compound that interferes with the normal functioning of TIGIT, by inhibiting or blocking TIGIT polypeptide activity. Examples of TIGIT antagonists include, but are not limited to antigen binding molecules that bind TIGIT, anti-TIGIT antibodies, and TIGIT-binding fragments of anti-TIGIT antibodies that specifically bind TIGIT such that the interaction between the TIGIT antagonist and TIGIT results in a reduction or cessation of TIGIT activity. It will be understood by one of ordinary skill in the art that in some instances, a TIGIT antagonist may antagonize one TIGIT activity without affecting another TIGIT activity. For example, in some embodiments, a TIGIT antagonist for use in certain of the methods herein is a TIGIT antagonist that antagonizes TIGIT activity in response to one of PVR interaction, PVRL3 interaction, or PVRL2 interaction, e.g., without affecting or minimally affecting any of the other TIGIT interactions. PVR is also known as CD155 and PVRL2 is also known as PVRL2.

[0082] The terms "TIGIT agonist" and "agonist of TIGIT activity" are used interchangeably and refer to a compound that enhances or stimulates the normal functioning of TIGIT by enhancing normal TIGIT activity (including, but not limited to, enhancing the stability of TIGIT or enhancing binding of TIGIT to one or more target ligands). For example, the TIGIT agonist can be selected from an antigen binding molecule, antibody, and

an antigen-binding fragment thereof. It will be understood by one of ordinary skill in the art that in some instances, a TIGIT agonist may agonize one TIGIT activity without affecting another TIGIT activity. For example, a desirable TIGIT agonist for use in certain of the methods herein is a TIGIT agonist that agonizes TIGIT activity in response to, or in place of, one of PVR interaction, PVRL3 interaction, or PVRL2 interaction, e.g., without affecting or minimally affecting any of the other TIGIT interactions.

[0083] The term "immune-related disease" means a disease in which a component of the immune system of a mammal causes, mediates or otherwise contributes to a morbidity in the mammal. Also included are diseases in which stimulation or intervention of the immune response has an ameliorative effect on progression of the disease. Included within this term are immune-mediated inflammatory diseases, non-immune-mediated inflammatory diseases, infectious diseases, immunodeficiency diseases, neoplasia, etc.

[0084] The term "T cell mediated disease" means an immune-related disease in which T cells directly or indirectly mediate or otherwise contribute to a morbidity in a mammal. The T cell mediated disease may be associated with cell mediated effects, lymphokine mediated effects, etc., and even effects associated with B cells if the B cells are stimulated, for example, by the lymphokines secreted by T cells.

[0085] Examples of immune-related and inflammatory diseases, some of which are immune or T cell mediated, which can be treated include systemic lupus erythematosis, rheumatoid arthritis, juvenile chronic arthritis, spondyloarthropathies, systemic sclerosis (scleroderma), idiopathic inflammatory myopathies (dermatomyositis, polymyositis), Sjogren's syndrome, systemic vasculitis, sarcoidosis, autoimmune hemolytic anemia (immune pancytopenia, paroxysmal nocturnal hemoglobinuria), autoimmune thrombocytopenia (idiopathic thrombocytopenic purpura, immune-mediated thrombocytopenia), thyroiditis (Grave's disease, Hashimoto's thyroiditis, juvenile lymphocytic thyroiditis, atrophic thyroiditis), diabetes mellitus, immune-mediated renal disease (glomerulonephritis, tubulointerstitial nephritis), demyelinating diseases of the central and peripheral nervous systems such as multiple sclerosis, idiopathic demyelinating polyneuropathy or Guillain-Barre syndrome, and chronic inflammatory demyelinating polyneuropathy, hepatobiliary diseases such as infectious hepatitis (hepatitis A, B, C, D, E and other non-hepatotropic

viruses), autoimmune chronic active hepatitis, primary biliary cirrhosis, granulomatous hepatitis, and sclerosing cholangitis, inflammatory bowel disorder (IBD) (ulcerative colitis: Crohn's disease), gluten-sensitive enteropathy, and Whipple's disease, autoimmune or immune-mediated skin diseases including bullous skin diseases, erythema multiforme and contact dermatitis, psoriasis, allergic diseases such as asthma, allergic rhinitis, atopic dermatitis, food hypersensitivity and urticaria, immunologic diseases of the lung such as eosinophilic pneumonias, idiopathic pulmonary fibrosis and hypersensitivity pneumonitis, transplantation associated diseases including graft rejection and graft-versus-host-disease. Infectious diseases including viral diseases such as AIDS (HIV infection), hepatitis A, B, C, D, and E, herpes, etc., bacterial infections, fungal infections, protozoal infections and parasitic infections also may have immune and/or inflammatory components and/or etiology.

[0086] Several diseases of the skin are correlated with an aberrant immune response and to autoimmunity. Diseases such as psoriasis are hallmarked by skin blistering, skin flaking, edema and the presence of autoantibodies that bind to skin proteins. TIGIT expression is upregulated in psoriatic skin vs. normal skin. Modulation of TIGIT expression and/or activity may be useful in treating the symptoms or underlying causes of psoriasis.

[0087] The term inflammatory bowel disorder ("IBD") describes a group of chronic inflammatory disorders of unknown causes in which the intestine (bowel) becomes inflamed, often causing recurring cramps or diarrhea. The prevalence of IBD in the US is estimated to be about 200 per 100,000 population. Patients with IBD can be divided into two major groups, those with ulcerative colitis ("UC") and those with Crohn's disease ("CD").

[0088] In patients with UC, there is an inflammatory reaction primarily involving the colonic mucosa. The inflammation is typically uniform and continuous with no intervening areas of normal mucosa. Surface mucosal cells as well as crypt epithelium and submucosa are involved in an inflammatory reaction with neutrophil infiltration. Ultimately, this situation typically progresses to epithelial damage with loss of epithelial cells resulting in multiple ulcerations, fibrosis, dysplasia and longitudinal retraction of the colon. CD differs from UC in that the inflammation extends through all layers of the intestinal wall and involves mesentery as well as lymph nodes. CD may affect any part of the alimentary canal from mouth to anus. The disease is often discontinuous, i.e., severely diseased segments of

bowel are separated from apparently disease-free areas. In CD, the bowel wall also thickens which can lead to obstructions. In addition, fistulas and fissures are not uncommon.

[0089] Clinically, IBD is characterized by diverse manifestations often resulting in a chronic, unpredictable course. Bloody diarrhea and abdominal pain are often accompanied by fever and weight loss. Anemia is not uncommon, as is severe fatigue. Joint manifestations ranging from arthralgia to acute arthritis as well as abnormalities in liver function are commonly associated with IBD. Patients with IBD also have an increased risk of colon carcinomas compared to the general population. During acute "attacks" of IBD, work and other normal activity are usually impossible, and often a patient is hospitalized.

[0090] Although the cause of IBD remains unknown, several factors, such as genetic, infectious and immunologic susceptibility, have been implicated. IBD is much more common in Caucasians, especially those of Jewish descent. The chronic inflammatory nature of the condition has prompted an intense search for a possible infectious cause. Although agents have been found which stimulate acute inflammation, none has been found to cause the chronic inflammation associated with IBD. The hypothesis that IBD is an autoimmune disease is supported by the previously mentioned extraintestinal manifestation of IBD as joint arthritis, and the known positive response to IBD by treatment with therapeutic agents such as adrenal glucocorticoids, cyclosporine and azathioprine, which are known to suppress immune response. In addition, the GI tract, more than any other organ of the body, is continuously exposed to potential antigenic substances such as proteins from food, bacterial byproducts (LPS), etc.

[0091] Further, the risk of colon cancer is highly elevated in patients with severe ulcerative colitis, particularly if the disease has existed for several years. About 20-25% of patients with IBD eventually require surgery for removal of the colon because of massive bleeding, chronic debilitating illness, performation of the colon, or risk of cancer. Surgery is also sometimes performed when other forms of medical treatment fail or when the side effects of steroids or other medications threaten the patient's health. As surgery is invasive and drastically life altering, it is not a highly desirable treatment regimen, and is typically the treatment of last resort. In order to better understand this disease and possibly treat it, experiments determined that TIGIT was upregulated both in CD and UC when compared to

normal tissue. Modulation of the expression and/or activity of TIGIT may prove useful in the treatment of one or more forms of IBD.

[0092] Rheumatoid arthritis (RA) is a chronic systemic autoimmune inflammatory disease that mainly involves the synovial membrane of multiple joints with resultant injury to the articular cartilage. The pathogenesis is T lymphocyte dependent and is associated with the production of rheumatoid factors, auto-antibodies directed against self IgG, with the resultant formation of immune complexes that attain high levels in joint fluid and blood. These complexes in the joint may induce the marked infiltrate of lymphocytes and monocytes into the synovium and subsequent marked synovial changes; the joint space/fluid if infiltrated by similar cells with the addition of numerous neutrophils. Tissues affected are primarily the joints, often in symmetrical pattern. However, extra-articular disease also occurs in two major forms. One form is the development of extra-articular lesions with ongoing progressive joint disease and typical lesions of pulmonary fibrosis, vasculitis, and cutaneous ulcers. The second form of extra-articular disease is the so called Felty's syndrome which occurs late in the RA disease course, sometimes after joint disease has become quiescent, and involves the presence of neutropenia, thrombocytopenia and splenomegaly. This can be accompanied by vasculitis in multiple organs with formations of infarcts, skin ulcers and gangrene. Patients often also develop rheumatoid nodules in the subcutis tissue overlying affected joints; the nodules late stage have necrotic centers surrounded by a mixed inflammatory cell infiltrate. Other manifestations which can occur in RA include: pericarditis, pleuritis, coronary arteritis, intestitial pneumonitis with pulmonary fibrosis, keratoconjunctivitis sicca, and rhematoid nodules.

[0093] Juvenile chronic arthritis is a chronic idiopathic inflammatory disease which begins often at less than 16 years of age. Its phenotype has some similarities to RA; some patients which are rhematoid factor positive are classified as juvenile rheumatoid arthritis. The disease is sub-classified into three major categories: pauciarticular, polyarticular, and systemic. The arthritis can be severe and is typically destructive and leads to joint ankylosis and retarded growth. Other manifestations can include chronic anterior uveitis and systemic amyloidosis.

[0094] The term "effective amount" is a concentration or amount of a polypeptide and/or agonist/antagonist which results in achieving a particular stated purpose. An "effective amount" of a polypeptide or agonist or antagonist thereof may be determined empirically. Furthermore, a "therapeutically effective amount" is a concentration or amount of a polypeptide and/or agonist/antagonist which is effective for achieving a stated therapeutic effect, which may be achieved in a single dose or multiple doses over time. This amount may also be determined empirically.

[0095] The term "cytotoxic agent" as used herein refers to a substance that inhibits or prevents the function of cells and/or causes destruction of cells. The term is intended to include radioactive isotopes (e.g., I^{131}, I^{125}, Y^{90} and Re^{186}), chemotherapeutic agents, and toxins such as enzymatically active toxins of bacterial, fungal, plant or animal origin, or fragments thereof.

[0096] A "chemotherapeutic agent" is a chemical compound useful in the treatment of cancer. Examples of chemotherapeutic agents include adriamycin, doxorubicin, epirubicin, 5-fluorouracil, cytosine arabinoside ("Ara-C"), cyclophosphamide, thiotepa, busulfan, cytoxin, taxoids, e.g., paclitaxel (Taxol, Bristol-Myers Squibb Oncology, Princeton, N.J.), and doxetaxel (Taxotere, Rhone-Poulenc Rorer, Antony, France), toxotere, methotrexate, cisplatin, melphalan, vinblastine, bleomycin, etoposide, ifosfamide, mitomycin C, mitoxantrone, vincristine, vinorelbine, carboplatin, teniposide, daunomycin, caminomycin, aminopterin, dactinomycin, mitomycins, esperamicins (see U.S. Pat. No. 4,675,187), melphalan and other related nitrogen mustards. Also included in this definition are hormonal agents that act to regulate or inhibit hormone action on tumors such as tamoxifen and onapristone.

[0097] As used herein, the term "inflammatory cells" designates cells that enhance the inflammatory response such as mononuclear cells, eosinophils, macrophages, and polymorphonuclear neutrophils (PMN).

Exemplary Anti-TIGIT Antigen Binding Molecules

[0098] Figs. 2A-2C and 3A-3C depict various sequences of anti-TIGIT antigen binding molecules. In some embodiments, the anti-TIGIT antigen binding molecule (including an anti-TIGIT antibody or antigen binding fragment thereof) results in immune

cell activation. In some embodiments, the antigen binding molecule (including an anti-TIGIT antibody or antigen binding fragment thereof) increase the activity of an immune cell. The increase of the activity of an immune cell can be detected using any method known in the art. In one embodiment, the increase in activity of an immune cell can be detected by measuring the proliferation of the immune cell. For example, an increase in activity of a T cell can be detected by measuring the proliferation of the T cell or signal transduction events such as tyrosine phosphorylation of immune receptors or downstream kinases that transmit signals to transcriptional regulators. In some embodiments, the increase in activity of an immune cell can be detected by measuring ctl or nk cell cytotoxic function on specific target cells. In some embodiments, the increase in activity of an immune cell can be detected by measuring t cell activation ex vivo in a sample derived from the subject. In some embodiments, the antigen binding molecule (such as a full length antibody or fragment thereof) includes the paired heavy and light chain sequences. In some embodiments, the antigen binding molecule includes the 3 heavy chain CDRs and the three light chain CDRs noted in FIGs. 2A-3C.

[0099] An antagonist anti-TIGIT antigen binding molecule (e.g., an anti-TIGIT antibody or antigen binding fragment thereof) antagonizes an activity of human TIGIT such as by inhibiting TIGIT binding to CD155 and CD112, and inhibiting functional itim signal transduction by TIGIT upon binding to CD155 and CD112. Measurement of anti-tigit antagonist activity can be assessed by demonstrating blocking of t cell suppression following tcr activation induced by TIGIT ligation with cognate ligands CD155 and CD112. Hence, in some embodiments of increased responses, treating with antagonist anti-TIGIT antigen binding molecules (e.g., an anti-TIGIT antibody or antigen binding fragment thereof) are able to rescue il-2 responses to levels observed in t cells that are not repressed by CD155 or CD112 induction of TIGIT. In a more preferred level of activation, responses, following treatment with an anti-TIGIT antagonist antigen binding molecules (e.g., an anti-TIGIT antibody or antigen binding fragment thereof) may increase responses to a level higher than t cell responses not repressed by CD155 or CD112.

[0100] In some embodiments, the anti-TIGIT antigen binding molecules (e.g., an anti-TIGIT antibody or antigen binding fragment thereof) are able to block binding of human TIGIT to human CD155 and human CD112. The ability to block binding of human TIGIT to

human CD155 and human CD112 can be determined using any method known in the art. In some embodiments, the ability of the antigen binding molecules (e.g., an anti-TIGIT antibody or antigen binding fragment thereof) to block binding of human TIGIT to human CD155 and human CD112 is determined using an ELISA assay.

[0101] Also included are polypeptides, e.g., immunoglobulin polypeptides, comprising amino acid sequences that are at least about 75% identical, 80% identical, more preferably at least about 90% identical and most preferably at least about 95% identical (e.g., 95%, 96%, 97%, 98%, 99%, 100%) to the amino acid sequences of the antigen binding molecules (e.g., an anti-TIGIT antibody or antigen binding fragment thereof) provided herein (e.g., an antigen binding molecule that includes one or more of the sequences in FIGs. 2A-3C) when the comparison is performed by a blast algorithm wherein the parameters of the algorithm are selected to give the largest match between the respective sequences over the entire length of the respective reference sequences (e.g. Expect threshold: 10; word size: 3; max matches in a query range: 0; blosum 62 matrix; gap costs: existence 11, extension 1; conditional compositional score matrix adjustment).

[0102] Sequence identity refers to the degree to which the amino acids of two polypeptides are the same at equivalent positions when the two sequences are optimally aligned.

[0103] The following references relate to blast algorithms often used for sequence analysis: blast algorithms: altschul et al. (2005) febs j. 272(20): 5101-5109; altschul, s.f., et al, (1990) j. Mol. Biol. 215:403-410; gish, w., et al, (1993) nature genet. 3:266-272; madden, t.l., et al, (1996) meth. Enzymol. 266: 131-141; altschul, s.f., et al, (1997) nucleic acids res. 25:3389-3402; zhang, j., et al, (1997) genome res. 7:649-656; wootton, j.c., et al, (1993) comput. Chem. 17: 149-163; hancock, j.m. et al, (1994) comput. Appl. Biosci. 10:67-70; Alignment scoring systems: dayhoff, m.o., et al, "a model of evolutionary change in proteins." in atlas of protein sequence and structure, (1978) vol. 5, suppl. 3. M.o. dayhoff (ed.), pp. 345-352, natl. Biomed. Res. Found., washington, dc; schwartz, r.m., et al, "matrices for detecting distant relationships." in atlas of protein sequence and structure, (1978) vol. 5, suppl. 3." m.o. dayhoff (ed.), pp. 353-358, natl. Biomed. Res. Found., washington, dc; altschul, s.f., (1991) j. Mol. Biol. 219:555-565; states, d.j., et al, (1991) methods 3:66-70;

henikoff, s., et al, (1992) proc. Natl. Acad. Sci. Usa 89:10915-10919; altschul, s.f., et al, (1993) j. Mol. Evol. 36:290-300; alignment statistics: karlin, s., et al, (1990) proc. Natl. Acad. Sci. Usa 87:2264-2268; karlin, s., et al, (1993) proc. Natl. Acad. Sci. Usa 90:5873-5877; dembo, a., et al, (1994) ann. Prob. 22:2022-2039; and altschul, s.f. "evaluating the statistical significance of multiple distinct local alignments." in theoretical and computational methods in genome research (s. Suhai, ed.), (1997) pp. 1-14, plenum, new york.

[0104] Binding affinity by way of example, and not limitation, the antigen binding molecules (e.g., an anti-TIGIT antibody or antigen binding fragment thereof) disclosed herein may bind human TIGIT with a K_D value at least as good as about 1 x 10^{-9}M (e.g., a K_D value of 1 x 10^{-9}M or lower numerically) as determined by surface plasmon resonance (e.g., biacore) or a similar technique (e.g. Kinexa or octet). In one embodiment, the antigen binding molecules (e.g., an anti-TIGIT antibody or antigen binding fragment thereof) disclosed herein may bind human TIGIT with a K_D value at least as good as about 1 x 10^{-9}M to about 1 x 10^{-12}M as determined by surface plasmon resonance (e.g., biacore) or a similar technique (e.g. Kinexa or octet). In some embodiments, the antigen binding molecules (e.g., an anti-TIGIT antibody or antigen binding fragment thereof) disclosed herein may bind human TIGIT with a K_D value of at about 1 x 10^{-9}M to about 1 x 10^{-12}M as determined by surface plasmon resonance (e.g., biacore) or a similar technique (e.g. Kinexa or octet). In some embodiments, the antigen binding molecules (e.g., an anti-TIGIT antibody or antigen binding fragment thereof) disclosed herein may bind human TIGIT with a K_D value of at least about 50 pm (i.e, a K_D value of about 50 pm or lower) as determined by biacore or a similar technique. In one embodiment, the antigen binding molecules (e.g., an anti-TIGIT antibody or antigen binding fragment thereof) disclosed herein may bind human TIGIT with a K_D value of at least as good as about 10 pM (e.g., a K_D numerical value of about 10 pm lower) as determined by biacore or a similar technique. In one embodiment, the antigen binding molecules (e.g., an anti-TIGIT antibody or antigen binding fragment thereof) may bind to human TIGIT with a K_D of about 50 pm to about 1 pm as determined by biacore or a similar technique.

[0105] The anti-TIGIT antigen binding molecules (e.g., an anti-TIGIT antibody or antigen binding fragment thereof) disclosed herein (e.g., an antigen binding molecule that

includes one or more of the sequences in FIGs. 2A-3C) may also be conjugated to a chemical moiety. The chemical moiety may be, inter alia, a polymer, a radionuclide or a cytotoxic factor. In some embodiments, the chemical moiety is a polymer which increases the half-life of the antigen binding molecule (e.g., an anti-TIGIT antibody or antigen binding fragment thereof) in the body of a subject. Suitable polymers include, but are not limited to, hydrophilic polymers which include but are not limited to polyethylene glycol (peg) (e.g., peg with a molecular weight of 2kda, 5 kda, 10 kda, 12kda, 20 kda, 30kda or 40kda), dextran and monomethoxypolyethylene glycol (mpeg). Lee, et al., (1999) (bioconj. Chem. 10:973-981) discloses peg conjugated single-chain antibodies. Wen, et al., (2001) (bioconj. Chem. 12:545-553) disclose conjugating antibodies with peg which is attached to a radiometal chelator (diethylenetriaminpentaacetic acid (dtp a)).

[0106] The antigen binding molecule (e.g., an anti-TIGIT antibody or antigen binding fragment thereof) disclosed herein (e.g., an antigen binding molecule that includes one or more of the sequences in FIGs. 2A-3C) may also be conjugated with labels such as ^{99}Tc, ^{90}Yy, ^{111}In, ^{32}P, ^{14}C, ^{125}L, ^{3}H, ^{131}I, ^{11}C, ^{15}O, ^{13}N, ^{18}F, ^{35}S, ^{51}Cr, ^{57}To, ^{226}Ra, ^{60}Co, ^{59}Fe, ^{57}Se, ^{152}Eu, ^{67}Cu, ^{217}Ci, ^{211}At, ^{212}Pb, ^{47}Sc, ^{109}Pd, ^{234}Th, ^{40}K, ^{157}Gd, ^{55}Mn, ^{52}Tr, and ^{56}Fe.

[0107] The antigen binding molecule (e.g., an anti-TIGIT antibody or antigen binding fragment thereof) disclosed herein (e.g., an antigen binding molecule that includes one or more of the sequences in FIGs. 2A-3C) may also be pegylated, for example to increase its biological (e.g., serum) half-life. To pegylate, the antigen binding molecule (e.g., an anti-TIGIT antibody or antigen binding fragment thereof), typically is reacted with a reactive form of polyethylene glycol (peg), such as a reactive ester or aldehyde derivative of peg, under conditions in which one or more peg groups become attached to the antigen binding molecule. In particular embodiments, the pegylation is carried out via an acylation reaction or an alkylation reaction with a reactive peg molecule (or an analogous reactive water-soluble polymer). As used herein, the term "polyethylene glycol" is intended to encompass any of the forms of peg that have been used to derivatize other proteins, such as mono (ci-cio) alkoxy- or aryloxy-polyethylene glycol or polyethylene glycol-maleimide. In some embodiments, the antigen binding molecule to be pegylated is an aglycosylated antibody or fragment. Methods

for pegylating proteins are known in the art and can be applied to the antibodies. See, e.g., ep 0 154 316 and ep 0 401 384.

[0108] The antigen binding molecules (e.g., an anti-TIGIT antibody or antigen binding fragment thereof) disclosed herein (e.g., an antigen binding molecule that includes one or more of the sequences in FIGs. 2A-3C) may also be conjugated with fluorescent or chemilluminescent labels, including fluorophores such as rare earth chelates, fluorescein and its derivatives, rhodamine and its derivatives, isothiocyanate, phycoerythrin, phycocyanin, allophycocyanin, o- phthaladehyde, fluorescamine,^{152}Eu, dansyl, umbelliferone, luciferin, luminal label, isoluminal label, an aromatic acridinium ester label, an imidazole label, an acridimium salt label, an oxalate ester label, an aequorin label, 2,3-dihydrophthalazinediones, biotin/avidin, spin labels and stable free radicals.

[0109] In some embodiments, an isolated antigen binding molecule that competes for binding to human TIGIT with an antibody that comprises any one or more of a CDR within any of figures 2A, 2B, 2C, 3A, 3B, or 3C is provided. In some embodiments, the isolated antigen binding molecule comprises all 6 CDRs from a single clone in any one of figures 2A, 2B, 2C, 3A, 3B, or 3C. In some embodiments, the isolated antigen binding molecule comprises at least 1, 2, 3, 4, or 5 CDRs from a single clone in any one of figures 2A, 2B, 2C, 3A, 3B, or 3C. In some embodiments, the isolated antigen binding molecule comprises a heavy and a light chain variable region from a single clone identified in any one of figures 2A, 2B, or 2C. In addition to the above, the CDR variants described within table 6.1 by position are also embodiments for a TIGIT antigen binding molecule.

[0110] In some embodiments, an isolated antigen binding molecule that binds to human TIGIT is provided. The isolated antigen binding molecules comprises a) a heavy chain CDR1 comprising the amino acid sequence of any one of the HCDR1s in Figure 3A, 3B, or 3C, b) a heavy chain CDR2 comprising the amino acid sequence of any one of the HCDR2s in Figure 3A, 3B, or 3C, and c) a heavy chain CDR3 comprising the amino acid sequence of any one of the HCDR3s in Figure 3A, 3B, or 3C. The HCDR1, HCDR2, and HCDR3 are from a same clone.

[0111] In some embodiments, an isolated antigen binding molecule that binds to human TIGIT is provided. The isolated antigen binding molecule comprises a) a heavy chain CDR1 comprising the amino acid sequence of any of one of the HCDR1s in Figure 3A, 3B, or 3C, b) a heavy chain CDR2 comprising the amino acid sequence of any one of the HCDR2s in Figure 3A, 3B, or 3C, c) a heavy chain CDR3 comprising the amino acid sequence of any one of the HCDR3s in

Figure 3A, 3B, or 3C, d) a light chain CDR1 comprising the amino acid sequence of any one of the LCDR1s in Figure 3A, 3B, or 3C, e) a light chain CDR2 comprising the amino acid sequence of any one of the LCDR2s in Figure 3A, 3B, or 3C, and f) a light chain CDR3 comprising the amino acid sequence of any one of the LCDR3s in Figure 3A, 3B, or 3C. The HCDR1, HCDR2, HCDR3, LCDR1, LCDR2, and LCDR3 are from a same clone.

[0112] In some embodiments, an isolated antigen binding molecule that binds to human TIGIT is provided. The isolated antigen binding molecule comprises a heavy chain comprising the heavy chain amino acid variable sequence in any one of Figures 2A, 2B, or 2C.

[0113] In some embodiments, an isolated antigen binding molecule that binds to human TIGIT is provide. The isolated antigen binding molecule comprises a light chain comprising the light chain amino acid variable sequence in any one of Figures 2A, 2B, or 2C.

[0114] In some embodiments, an isolated antigen binding molecule that binds to human TIGIT is provided. The isolated antigen binding molecule comprises a heavy chain comprising the heavy chain amino acid variable sequence in any one of Figures 2A, 2B, or 2C and a light chain comprising the light chain amino acid variable sequence in any one of Figures 2A, 2B, or 2C.

[0115] In some embodiments, an isolated antigen binding molecule that binds to human TIGIT is provided. The isolated antigen binding molecule comprises a heavy chain CDR1 comprising $SSYX_4MX_6$ (SEQ ID NO: 1600; Figure 5) wherein X_4 is A, G, or S and X_6 is H, N, or S, and a heavy chain CDR2 comprising $WVY_3Y_4IY_6Y_7Y_8Y_9Y_{10}Y_{11}Y_{12}Y_{13}$ (SEQ ID NO: 1601; Figure 5) wherein Y_3 is S or A, Y_4 is G, N, S, Y, or A, Y_6 is S, K, or N, Y_7 is S, Y, or G, Y_8 is N or S, Y_9 is G, S, A, or T, Y_{10} is G or S, Y_{11} is S, N, or T, Y_{12} is T, K, S, or I, Y_{13} is S, Y, or G, and a heavy chain CDR3 comprising $ARZ_3PYZ_6Z_7WZ_9D$ (SEQ ID NO: 1602; Figure 5), wherein Z_3 is V, A, G, or E, Z_6 is S, D, or G, Z_7 is V or Y, and Z_9 is I, A, M, or L. In some embodiments, the antigen binding molecule comprises 1, 2, 3, 4, 5, or all 6 of the above CDRs. In some embodiments, and one or more of the variable positions in the CDRs can be replaced with a conservative substitution.

[0116] In some embodiments, an isolated binding molecule that binds to human TIGIT is provided. The isolated antigen binding molecule comprises at least one of: a) (i) a heavy chain variable region comprising the amino acid sequence of SEQ ID NO: 23 and (ii) a light chain variable region comprising the amino acid sequence of SEQ ID NO: 120, b) (i) a heavy chain variable region comprising the amino acid sequence of SEQ ID NO: 29 and (ii) a light chain variable region comprising the amino acid sequence of SEQ ID NO: 126, c) (i) a heavy chain variable region comprising the amino acid sequence of SEQ ID NO: 45 and (ii) a light chain variable region

comprising the amino acid sequence of SEQ ID NO: 142, d) (i) a heavy chain variable region comprising the amino acid sequence of SEQ ID NO: 46 and (ii) a light chain variable region comprising the amino acid sequence of SEQ ID NO: 143, e) (i) a heavy chain variable region comprising the amino acid sequence of SEQ ID NO: 58 and (ii) a light chain variable region comprising the amino acid sequence of SEQ ID NO: 155; f) (i) a heavy chain variable region comprising the amino acid sequence of SEQ ID NO: 63 and (ii) a light chain variable region comprising the amino acid sequence of SEQ ID NO: 160, g) (i) a heavy chain variable region comprising the amino acid sequence of SEQ ID NO: 67 and (ii) a light chain variable region comprising the amino acid sequence of SEQ ID NO:164, h) (i) a heavy chain variable region comprising the amino acid sequence of SEQ ID NO: 72 and (ii) a light chain variable region comprising the amino acid sequence of SEQ ID NO: 169, I) (i) a heavy chain variable region comprising the amino acid sequence of SEQ ID NO: 80 and (ii) a light chain variable region comprising the amino acid sequence of SEQ ID NO: 177, or j) (i) a heavy chain variable region that is at least 85% identical to any of the heavy chain variable regions in (a)-(i) and (ii) a light chain variable region that is at least 85% identical to any of the light chain variable regions in (a)-(i).

[0117] In some embodiments, an isolated antigen binding molecule that binds to human TIGIT is provided. The isolated antigen binding molecule comprises a heavy chain CDR3 of contiguous amino acids $Z_1Z_2Z_3Z_4Z_5Z_6Z_7Z_8Z_9Z_{10}$ (SEQ ID NO: 1599; Figure 5) wherein Z_1 is A, Z_2 is R, Z_3 is E, Z_4 is P, Z_5 is Y, Z_6 is D, G, or S, Z_7 is V, Y, or T, Z_8 is W, Z_9 is I, L, or M, and Z_{10} is D. In some embodiments, Z_6 is D. In some embodiments, Z_6 is G. In some embodiments, Z_6 is S. In some embodiments, Z_7 is V. In some embodiments, Z_7 is Y. In some embodiments, Z_7 is T. In some embodiments, Z_9 is I. In some embodiments, Z_9 is L. In some embodiments, Z_9 is M.

[0118] In some embodiments, an isolated antibody that comprises: a) a heavy chain CDR1 comprising the amino acid sequence of any of one of the HCDR1s in Figure 3A, 3B, or 3C, b) a heavy chain CDR2 comprising the amino acid sequence of any one of the HCDR2s in Figure 3A, 3B, or 3C, c) a heavy chain CDR3 comprising the amino acid sequence of any one of the HCDR3s in Figure 3A, 3B, or 3C, d) a light chain CDR1 comprising the amino acid sequence of any one of the LCDR1s in Figure 3A, 3B, or 3C, e) a light chain CDR2 comprising the amino acid sequence of any one of the LCDR2s in Figure 3A, 3B, or 3C, and f) (f) a light chain CDR3 comprising the amino acid sequence of any one of the LCDR3s in Figure 3A, 3B, or 3C is provided. The HCDR1, HCDR2, HCDR3, LCDR1, LCDR2, and LCDR3 are from a same clone.

[0119] In some embodiments, the isolated antibody comprises a heavy chain comprising the heavy chain amino acid variable sequence in any one of Figures 2A, 2B, or 2C, or a sequence at least 90% identical thereto.

[0120] In some embodiments, the isolated antibody comprises a light chain comprising the light chain amino acid variable sequence in any one of Figures 2A, 2B, or 2C, or a sequence at least 90% identical thereto.

[0121] In some embodiments, the isolated antibody comprises a heavy chain comprising the heavy chain amino acid variable sequence in any one of Figures 2A, 2B, or 2C, or a sequence at least 90% identical thereto, and a light chain comprising the light chain amino acid variable sequence in any one of Figures 2A, 2B, or 2C or a sequence at least 90% identical thereto.

[0122] In some embodiments, the isolated antigen binding molecule isolated antibody binds to human TIGIT with a K_D of $1x10^{-7}M$ or lower (numerically).

[0123] In some embodiments, the isolated antigen binding molecule or isolated antibody has antagonist activity to human TIGIT.

[0124] In some embodiments, the antigen binding molecule is an antibody. In some embodiments, the antibody is an intact human antibody. In some embodiments, the antibody is an antibody binding fragment. In some embodiments, the antibody is a chimeric or a humanized antibody. In some embodiments, the antibody binds to human TIGIT with a K_D of 100 nM or less (numerically).

[0125] In some embodiments, the isolated antigen binding molecule or isolated antibody blocks binding of human TIGIT to human CD155 and human CD112.

[0126] In some embodiments, the isolated antigen binding molecule or antibody is a bispecific antibody. In some embodiments, the bispecific antibody further binds to PD-1.

[0127] In some embodiments, the isolated antigen binding molecule binds to human TIGIT and comprises at least one of: a) (i) a heavy chain variable region comprising the heavy chain of clone Ab117 and (ii) a light chain variable region comprising the light chain of clone Ab117, b) (i) a heavy chain variable region comprising the heavy chain of clone Ab53 and (ii) a light chain variable region comprising the light chain of clone Ab53, c) (i) a heavy chain variable region comprising the heavy chain of clone Ab40 and (ii) a light chain variable region comprising the light chain of clone Ab40, d) (i) a heavy chain variable region comprising the heavy chain of clone Ab48 and (ii) a light chain variable region comprising the light chain of clone Ab48, e) (i) a heavy chain variable region comprising the heavy chain of clone Ab1 and (ii) a light chain variable region

comprising the light chain of clone Ab1, or f) (i) a heavy chain variable region comprising the heavy chain of clone Ab143 and (ii) a light chain variable region comprising the light chain of clone Ab143. In some embodiments, rather than the heavy and light chain variable regions of the above antibodies, the 6 CDRs are present in the antigen binding molecules.

Methods of Therapy

[0128] Further provided are methods for treating subjects, including human subjects, in need of treatment with the isolated antigen binding molecules (e.g., an anti-TIGIT antibody or antigen binding fragment thereof) disclosed herein (e.g., an antigen binding molecule that includes one or more of the sequences in FIGs. 2A-3C). In some embodiments, the antigen binding molecule (such as a full length antibody or fragment thereof) includes the paired heavy and light chain sequences. In some embodiments, the antigen binding molecule includes the 3 heavy chain CDRs and the three light chain CDRs noted in FIGs. 2A-3C. In some embodiments, the subject suffers from an infection or an infectious disease. In some embodiments, the subject suffers from cancer. In some embodiments, the cancer is a solid tumor which is infiltrated by tumor-infiltrating lymphocytes which express TIGIT. In some embodiments, the cancer is, e.g., osteosarcoma, rhabdomyosarcoma, neuroblastoma, kidney cancer, leukemia, renal transitional cell cancer, bladder cancer, wilm's cancer, ovarian cancer, pancreatic cancer, breast cancer, prostate cancer, bone cancer, lung cancer (e.g., non-small cell lung cancer), gastric cancer, colorectal cancer, cervical cancer, synovial sarcoma, head and neck cancer, squamous cell carcinoma, multiple myeloma, renal cell cancer, retinoblastoma, hepatoblastoma, hepatocellular carcinoma, melanoma, rhabdoid tumor of the kidney, ewing's sarcoma, chondrosarcoma, brain cancer, glioblastoma, meningioma, pituitary adenoma, vestibular schwannoma, a primitive neuroectodermal tumor, medulloblastoma, astrocytoma, anaplastic astrocytoma, oligodendroglioma, ependymoma, choroid plexus papilloma, polycythemia vera, thrombocythemia, idiopathic myelfibrosis, soft tissue sarcoma, thyroid cancer, endometrial cancer, carcinoid cancer or liver cancer, breast cancer or gastric cancer. In some embodiments, the cancer is metastatic cancer, e.g., of the varieties described above. In some embodiments, a method for treating a subject using an anti-TIGIT antibody or antigen-binding fragment thereof (e.g., an antigen binding molecule that includes one or more of the

sequences in FIGs. 2A-3C) is provided. The subject suffers from a viral infection. In some embodiments, the viral infection is infection with a virus selected from the group consisting of human immunodeficiency virus (HIV), hepatitis virus (a, b, or c), herpes virus (e.g., vzv, hsv-i, hav-6, hsv-ii, and cmv, epstein barr virus), adenovirus, influenza virus, flaviviruses, echovirus, rhinovirus, coxsackie virus, coronavirus, respiratory syncytial virus, mumps virus, rotavirus, measles virus, rubella virus, parvovirus, vaccinia virus, htlv virus, dengue virus, papillomavirus, molluscum virus, poliovirus, rabies virus, jc virus or arboviral encephalitis virus.

[0129] In some embodiments, methods for treating subjects using an anti-TIGIT antigen binding molecule (e.g., an anti-TIGIT antibody or antigen binding fragment thereof) are provided, wherein the subject suffers from a bacterial infection. In some embodiments, the bacterial infection is infection with a bacteria selected from the group consisting of chlamydia, rickettsial bacteria, mycobacteria, staphylococci, streptococci, pneumonococci, meningococci and gonococci, klebsiella, proteus, serratia, pseudomonas, legionella, coryneb acterium diphtheriae, salmonella, bacilli, vibrio cholerae, clostridium tetan, clostridium botulinum, bacillus anthricis, yersinia pestis, mycobacterium leprae, mycobacterium lepromatosis, and borriella. In some embodiments, methods for treating subjects using an anti-TIGIT antigen binding molecule (e.g., an anti-TIGIT antibody or antigen binding fragment thereof) are provided, wherein the subject suffers from a fungal infection. In some embodiments, the fungal infection is infection with a fungus selected from the group consisting of candida (albicans, krusei, glabrata, tropicalis, etc.), cryptococcus neoformans, aspergillus (fumigatus, niger, etc.), genus mucorales (mucor, absidia, rhizopus), sporothrix schenkii, blastomyces dermatitidis, paracoccidioides brasiliensis, coccidioides immitis and histoplasma capsulatum.

[0130] In some embodiments, methods for treating subjects using an anti-TIGIT antigen binding molecule (e.g., an anti-TIGIT antibody or antigen binding fragment thereof) are provided, wherein the subject suffers from a parasitic infection. In some embodiments, the parasitic infection is an infection with a parasite selected from the group consisting of entamoeba histolytica, balantidium coli, naegleria fowleri, acanthamoeba, giardia lambia, cryptosporidium, pneumocystis carinii, plasmodium vivax, babesia microti, trypanosoma

brucei, trypanosoma cruzi, leishmania donovani, toxoplasma gondii and nippostrongylus brasiliensis.

[0131] In some embodiments, a method for preventing or inhibiting TIGIT binding to MHC class ii, enhancing antigen-specific t-cell activation or stimulating t-cell production of interleukin-2 in a subject (e.g., human), for example, is provided wherein the subject suffers from cancer or infectious disease (e.g., as discussed herein) comprising administering an effective amount of anti-TIGIT antigen binding molecule (e.g., an antigen binding molecule that includes one or more of the sequences in FIGs. 2A-3C), optionally in association with a further chemotherapeutic agent. In some embodiments, any one or more of anti-TIGIT antigen binding molecules can be co-administered with one or more chemotherapeutics, such as any of: adriamycin, doxorubicin, epirubicin, 5-fluorouracil, cytosine arabinoside ("Ara-C"), cyclophosphamide, thiotepa, busulfan, cytoxin, taxoids, e.g., paclitaxel (Taxol, Bristol-Myers Squibb Oncology, Princeton, N.J.), and doxetaxel (Taxotere, Rhone-Poulenc Rorer, Antony, France), toxotere, methotrexate, cisplatin, melphalan, vinblastine, bleomycin, etoposide, ifosfamide, mitomycin C, mitoxantrone, vincristine, vinorelbine, carboplatin, teniposide, daunomycin, caminomycin, aminopterin, dactinomycin, mitomycins, esperamicins (see U.S. Pat. No. 4,675,187), melphalan, other related nitrogen mustards, and hormonal agents that act to regulate or inhibit hormone action on tumors such as tamoxifen and onapristone. In some embodiments, any one or more of the anti-TIGIT antigen binding molecules can be co-administered with other immuno-oncoligic agents, including either or both of anti-PD-1 and anti-PDL-1 antibodies.

[0132] In some embodiments, the subject can be a mammal such as a human, dog, cat, horse, cow, mouse, rat, monkey (e.g., cynomolgous monkey, e.g., macaca fascicularis) or rabbit. In preferred embodiments, the subject is a human subject.

[0133] In some embodiments, the antigen binding molecule (e.g., an anti-TIGIT antibody or antigen binding fragment thereof) disclosed herein (e.g., an antigen binding molecule that includes one or more of the sequences in FIGs. 2A-3C) can be used alone, or in association with other, further therapeutic agents and/or therapeutic procedures, for treating or preventing any disease such as cancer, e.g., as discussed herein, in a subject in need of such treatment or prevention. Compositions, e.g., pharmaceutical compositions comprising a

pharmaceutically acceptable carrier, comprising such antibodies and fragments in association with further therapeutic agents are also contemplated.

[0134] In some embodiments, a method of treating a TIGIT related disorder is provided. The method can comprise a) Identifying a subject with a TIGIT related disorder and b) administering an effective dose of an isolated antigen binding molecule or antibody as provided herein to the subject. In some embodiments, the TIGIT related disorder is selected from the group consisting of at least one of: HIV, psoriasis, arthritis, inflammatory bowel disease, and cancer. In some embodiments, the cancer is at least one of: a solid tumor which is infiltrated by tumor-infiltrating lymphocytes which express TIGIT, osteosarcoma, rhabdomyosarcoma, neuroblastoma, kidney cancer, leukemia, renal transitional cell cancer, bladder cancer, Wilm's cancer, ovarian cancer, pancreatic cancer, breast cancer, prostate cancer, bone cancer, lung cancer, non-small cell lung cancer, gastric cancer, colon cancer, colorectal cancer, cervical cancer, synovial sarcoma, head and neck cancer, squamous cell carcinoma, multiple myeloma, renal cell cancer, retinoblastoma, hepatoblastoma, hepatocellular carcinoma, melanoma, rhabdoid tumor of the kidney, Ewing's sarcoma, chondrosarcoma, brain cancer, glioblastoma, meningioma, pituitary adenoma, vestibular schwannoma, a primitive neuroectodermal tumor, medulloblastoma, astrocytoma, anaplastic astrocytoma, oligodendroglioma, ependymoma, choroid plexus papilloma, polycythemia vera, thrombocythemia, idiopathic myelfibrosis, soft tissue sarcoma, thyroid cancer, endometrial cancer, carcinoid cancer or liver cancer, breast cancer, gastric cancer, a metastatic cancer of the varieties described above.

[0135] In some embodiments, a method of enhancing T-cell activation is provided. The method comprises a) diagnosing an individual with low T-cell counts and b) administering an effective dose of the isolated antigen binding molecule or isolated antibody as provided herein. In some embodiments, T-cell activation is of CD8+ T cells.

[0136] In some embodiments, a method of preventing, treating and/or lessening the severity of an immune-related disease relating to aberrant immune cell response in a subject is provided. The method comprises modulating the activity of TIGIT in the subject by administering an effective amount of any one or more of the isolated antigen binding molecules or antibodies provided herein.

[0137] In some embodiments, a method of increasing or stimulating an immune response is provided. The method includes administering in vitro or in vivo an antagonist of TIGIT activity, and/or by inhibiting intracellular signaling mediated by TIGIT binding to PVR (aka CD155),

wherein the antagonist of TIGIT activity is any one or more of the isolated antigen binding molecules or isolated antibodies as provided herein.

[0138] In some embodiments, a method of increasing T cell activation is provided. The method comprises administering any one or more of the isolated antigen binding molecules or isolated antibodies provided herein to a subject in an amount sufficient to block TIGIT in the subject.

[0139] In some embodiments, a method of treating an infection or infectious disease in a human subject is provided. The method comprises administering to a subject who has an infectious disease an effective amount of the isolated antigen binding molecule or isolated antibody as provided herein.

[0140] In some embodiments, a method for increasing an effectiveness of a vaccine is provided. The method comprises administering a vaccine to a subject and administering any one or more of the isolated antigen binding molecules or antibodies provided herein to the subject in an amount sufficient to serve as an adjuvant for the vaccine.

[0141] In some embodiments, a method for treating an infection is provided. The method comprises identifying a subject that has a viral infection, a bacterial infection, parasitic infection, and/or a fungal infection, and administering any one or more of the antigen binding molecules or isolated antibodies provided herein to the subject in an amount and for a duration sufficient to treat the viral infection, the bacterial infection, the parasitic infection, and/or the fungal infection. In some embodiments, In some embodiments, the viral infection is an infection with a virus selected from the group consisting of at least one of: human immunodeficiency virus (HIV), hepatitis virus (A, B, or C), herpes virus (e.g., VZV, HSV-I, HAV-6, HSV-II, and CMV, Epstein Barr virus), adenovirus, influenza virus, flaviviruses, echovirus, rhinovirus, coxsackie virus, coronavirus, respiratory syncytial virus, mumps virus, rotavirus, measles virus, rubella virus, parvovirus, vaccinia virus, HTLV virus, dengue virus, papillomavirus, molluscum virus, poliovirus, rabies virus, JC virus and arboviral encephalitis virus. In some embodiments, the bacterial infection is infection with a bacteria selected from the group consisting of at least one or: Chlamydia, rickettsial bacteria, mycobacteria, staphylococci, streptococci, pneumonococci, meningococci and gonococci, klebsiella, proteus, serratia, pseudomonas, Legionella, Coryneb acterium diphtheriae, Salmonella, bacilli, Vibrio cholerae, Clostridium tetan, Clostridium botulinum, Bacillus anthricis, Yersinia pestis, Mycobacterium leprae, Mycobacterium lepromatosis, and Borriella. In some embodiments, the fungal infection is infection with a fungus selected from the group consisting of at least one of: Candida (albicans, krusei, glabrata, tropicalis, etc.), Cryptococcus neoformans, Aspergillus

(fumigatus, niger, etc.), Genus Mucorales (mucor, absidia, rhizopus), Sporothrix schenkii, Blastomyces dermatitidis, Paracoccidioides brasiliensis, Coccidioides immitis, and Histoplasma capsulatum. In some embodiments, the parasitic infection is infection with a parasite selected from the group consisting of at least one of: Entamoeba histolytica, Balantidium coli, Naegleria fowleri, Acanthamoeba, Giardia lambia, Cryptosporidium, Pneumocystis carinii, Plasmodium vivax, Babesia microti, Trypanosoma brucei, Trypanosoma cruzi, Leishmania donovani, Toxoplasma gondii, and Nippostrongylus brasiliensis.

[0142] In some embodiments, a method for preventing and/or inhibiting TIGIT binding to MHC class II to enhance antigen-specific T-cell activation or stimulating T-cell production of interleukin-2 in a subject is provided. The method comprises administering any one or more of the antigen binding molecules to a subject in an amount sufficient for preventing and/or inhibiting TIGIT binding to MHC class II in the subject.

[0143] In some embodiments, a method of preventing, treating and/or lessening the severity of a disease in a subject is provided. The method comprises modulating the activity of TIGIT in the subject by administering an effective amount of any one or more of the isolated antigen binding molecules or isolated antibodies provided herein. The disease is selected from the group consisting of: systemic lupus erythematosis, rheumatoid arthritis, juvenile chronic arthritis, spondyloarthropathies, systemic sclerosis (scleroderma), idiopathic inflammatory myopathies (dermatomyositis, polymyositis), Sjogren's syndrome, systemic vasculitis, sarcoidosis, autoimmune hemolytic anemia (immune pancytopenia, paroxysmal nocturnal hemoglobinuria), autoimmune thrombocytopenia (idiopathic thrombocytopenic purpura, immune-mediated thrombocytopenia), thyroiditis (Grave's disease, Hashimoto's thyroiditis, juvenile lymphocytic thyroiditis, atrophic thyroiditis), diabetes mellitus, immune-mediated renal disease (glomerulonephritis, tubulointerstitial nephritis), demyelinating diseases of the central and peripheral nervous systems such as multiple sclerosis, idiopathic demyelinating polyneuropathy or Guillain-Barre syndrome, and chronic inflammatory demyelinating polyneuropathy, hepatobiliary diseases such as infectious hepatitis (hepatitis A, B, C, D, E and other non-hepatotropic viruses), autoimmune chronic active hepatitis, primary biliary cirrhosis, granulomatous hepatitis, and sclerosing cholangitis, inflammatory bowel disorder (IBD) (ulcerative colitis: Crohn's disease), gluten-sensitive enteropathy, and Whipple's disease, autoimmune or immune-mediated skin diseases including bullous skin diseases, erythema multiforme and contact dermatitis, psoriasis, allergic diseases such as asthma, allergic rhinitis, atopic dermatitis, food hypersensitivity and urticaria, immunologic diseases of the lung such as eosinophilic pneumonias, idiopathic pulmonary fibrosis and hypersensitivity pneumonitis, transplantation

associated diseases including graft rejection and graft-versus-host-disease. Infectious diseases including viral diseases such as AIDS (HIV infection), hepatitis A, B, C, D, and E, herpes, etc., bacterial infections, fungal infections, protozoal infections and parasitic infections also may have immune and/or inflammatory components and/or etiology.

Pharmaceutical compositions

[0144] To prepare pharmaceutical or sterile compositions of the anti-TIGIT antigen binding molecule (e.g., an anti-TIGIT antibody or antigen binding fragment thereof that includes one or more of the sequences in FIGs. 2A-3C) is admixed with a pharmaceutically acceptable carrier or excipient. See, e.g., Remington's Pharmaceutical Sciences and U.S. Pharmacopeia: National Formulary, Mack Publishing Company, Easton, PA (1984). Formulations of therapeutic and diagnostic agents may be prepared by mixing with acceptable carriers, excipients, or stabilizers in the form of, e.g., lyophilized powders, slurries, aqueous solutions or suspensions (see, e.g., Hardman, et al. (2001) Goodman and Gilman 's The Pharmacological Basis of Therapeutics, McGraw-Hill, New York, NY; Gennaro (2000) Remington: The Science and Practice of Pharmacy, Lippincott, Williams, and Wilkins, New York, NY; Avis, et al. (eds.) (1993) Pharmaceutical Dosage Forms: Parenteral Medications, Marcel Dekker, NY; Lieberman, et al. (eds.) (1990) Pharmaceutical Dosage Forms: Tablets, Marcel Dekker, NY; Lieberman, et al. (eds.) (1990) Pharmaceutical Dosage Forms: Disperse Systems, Marcel Dekker, NY; Weiner and Kotkoskie (2000) Excipient Toxicity and Safety, Marcel Dekker, Inc., New York, NY).

[0145] Toxicity and therapeutic efficacy of the antigen binding molecule (e.g., an anti-TIGIT antibody or antigen binding fragment thereof), administered alone or in combination with another therapeutic agent, can be determined by standard pharmaceutical procedures in cell cultures or experimental animals, e.g., for determining the LD50(the dose lethal to 50% of the population) and the ED50(the dose therapeutically effective in 50% of the population). The dose ratio between toxic and therapeutic effects is the therapeutic index (LD50/ ED50). The data obtained from these cell culture assays and animal studies can be used in formulating a range of dosage for use in human. The dosage of such compounds lies preferably within a range of circulating concentrations that include the ED_{50} with little or no

toxicity. The dosage may vary within this range depending upon the dosage form employed and the route of administration.

[0146] In some embodiments, a further therapeutic agent that is administered to a subject in association with an anti-TIGIT antigen binding molecule in accordance with the Physicians' Desk Reference 2003 (Thomson Healthcare; 57th edition (November 1, 2002)). The mode of administration can vary. Routes of administration include oral, rectal, transmucosal, intestinal, parenteral; intramuscular, subcutaneous, intradermal, intramedullary, intrathecal, direct intraventricular, intravenous, intraperitoneal, intranasal, intraocular, inhalation, insufflation, topical, cutaneous, transdermal, or intra-arterial.

[0147] In some embodiments, the anti-TIGIT antigen binding molecule (e.g., an anti-TIGIT antibody or antigen binding fragment thereof that includes one or more of the sequences in FIGs. 2A-3C) can be administered by an invasive route such as by injection. In some embodiments, an anti- TIGIT antigen binding molecule (e.g., an anti-TIGIT antibody or antigen binding fragment thereof), or pharmaceutical composition thereof, is administered intravenously, subcutaneously, intramuscularly, intraarterially, intratumorally, or by inhalation, aerosol delivery. Administration by non-invasive routes (e.g., orally; for example, in a pill, capsule or tablet) is also an option.

[0148] In some embodiments, a composition is provided. The composition comprises an isolated antigen binding molecule (such as an antibody) as provided herein in an amount that is pharmaceutically acceptable and a pharmaceutically acceptable carrier.

Polynucleotides

[0149] Provided herein are polynucleotides encoding any of the polypeptides or immunoglobulin chains of anti-TIGIT antigen binding molecule (e.g., an anti-TIGIT antibody or antigen binding fragment thereof). For example, various embodiments include the polynucleotides encoding the amino acids described in FIGs. 1A, 2B, 2C, 3A, 3B, and 3C, as well as polynucleotides which hybridize thereto and, also, any polypeptide encoded by such a hybridizing polynucleotide.

[0150] In general, the polynucleotides hybridize under low, moderate or high stringency conditions, and encode antigen binding molecules (e.g., an anti-TIGIT antibody or antigen binding fragment thereof) that maintain the ability to bind to TIGIT (human, rhesus

and/or cynomolgous monkey, e.g., Macaca fascicularis). A first polynucleotide molecule is "hybridizable" to a second polynucleotide molecule when a single stranded form of the first polynucleotide molecule can anneal to the second polynucleotide molecule under the appropriate conditions of temperature and solution ionic strength (see Sambrook, et al., supra). The conditions of temperature and ionic strength determine the "stringency" of the hybridization. Typical low stringency hybridization conditions include 55°C, 5X SSC, 0.1% SDS and no formamide; or 30% formamide, 5X SSC, 0.5% SDS at 42°C. Typical moderate stringency hybridization conditions are 40% formamide, with 5X or 6X SSC and 0.1% SDS at 42°C. High stringency hybridization conditions are 50% formamide, 5X or 6X SSC at 42°C or, optionally, at a higher temperature (e.g., 57°C, 59°C, 60°C, 62°C, 63°C, 65°C or 68°C). In general, SSC is 0.15M NaCl and 0.015M Na-citrate. Hybridization requires that the two polynucleotide contain complementary sequences, although, depending on the stringency of the hybridization, mismatches between bases are possible. The appropriate stringency for hybridizing polynucleotides depends on the length of the polynucleotides and the degree of complementation, variables well known in the art. The greater the degree of similarity or homology between two nucleotide sequences, the higher the stringency under which the nucleic acids may hybridize. For hybrids of greater than 100 nucleotides in length, equations for calculating the melting temperature have been derived (see Sambrook, et al., supra, 9.50-9.51). For hybridization with shorter polynucleotides, e.g., oligonucleotides, the position of mismatches becomes more important, and the length of the oligonucleotide determines its specificity (see Sambrook, et al., supra, 11.7-11.8).

[0151] In some embodiments, an isolated polynucleotide, for example DNA, encoding the polypeptide chains of the isolated antigen binding molecule (e.g., an anti-TIGIT antibody or antigen binding fragment thereof) set forth herein is provided. In some embodiments, the isolated polynucleotide encodes an antigen binding molecule (e.g., an anti-TIGIT antibody or antigen binding fragment thereof) comprising at least one mature immunoglobulin light chain variable (VL) domain according including the sequences provided herein and/or at least one mature immunoglobulin heavy chain variable (VH) domain including the sequences provided herein. In some embodiments the isolated polynucleotide encodes both a light chain and a heavy chain on a single

polynucleotide molecule, and in other embodiments the light and heavy chains are encoded on separate polynucleotide molecules. In another embodiment the polynucleotides further encodes a signal sequence. In some embodiments, the polynucleotide encodes one or more of the CDR sequences provided in any one of FIGs. 2A-3C.

[0152] Further envisioned are vectors, e.g., expression vectors, such as plasmids, comprising the above isolated polynucleotides, wherein the polynucleotide is operably linked to control sequences that are recognized by a host cell when the host cell is transfected with the vector. Also provided are host cells comprising such a vector and methods for producing the antigen binding molecule (e.g., an anti-TIGIT antibody or antigen binding fragment thereof) or polypeptide disclosed herein comprising culturing a host cell harboring an expression vector or a nucleic acid encoding the immunoglobulin chains of the antigen binding molecule (e.g., an anti-TIGIT antibody or antigen binding fragment thereof) in culture medium, and isolating the antigen or antigen-binding fragment thereof from the host cell or culture medium.

Methods of Making

[0153] In some embodiments, a method of making an isolated antigen binding molecule that binds to human TIGIT is provided. The method comprises providing a nucleic acid that encodes for the isolated antigen binding molecule or isolated antibody provided herein, and expressing a protein encoded by the nucleic acid. In some embodiments, the isolated antigen binding molecule is expressed in a CHO cell.

[0154] Hybridoma cells that produce parental (e.g., rat or mouse) monoclonal anti-TIGIT antigen binding molecule (e.g., an anti-TIGIT antibody or antigen binding fragment thereof) discussed herein may be produced by methods which are known in the art. Such isolated hybridomas are also contemplated in regard to the sequences provided in FIGs. 2A-3C. The methods include, but are not limited to, the hybridoma technique originally developed by Kohler, et al., (1975) (Nature 256:495-497), as well as the trioma technique (Hering, et al., (1988) Biomed. Biochim. Acta. 47:211-216 and Hagiwara, et al., (1993) Hum. Antibod. Hybridomas 4: 15), the human B-cell hybridoma technique (Kozbor, et al., (1983) Immunology Today 4:72 and Cote, et al., (1983) Proc. Natl. Acad. Sci. U.S.A 80:2026-2030), the EBV-hybridoma technique (Cole, et al., in Monoclonal Antibodies and Cancer Therapy,

Alan R. Liss, Inc., pp. 77-96, 1985), and electric field based electrofusion using a Cyto Pulse large chamber cull fusion electroporator (Cyto Pulse Sciences, Inc., Glen Burnie, MD).

[0155] Preferably, mouse splenocytes are isolated and fused with PEG or by electrofusion to a mouse myeloma cell line based upon standard protocols. The resulting hybridomas may then be screened for the production of antigen- specific antibodies. For example, single cell suspensions of splenic lymphocytes from immunized mice may by fused to one-sixth the number of P3X63- Ag8.653 nonsecreting mouse myeloma cells (ATCC, CRL 1580) with 50% PEG. Cells may be plated at approximately 2 x 10<5>cells/mL in a flat bottom microtiter plate, followed by a two week incubation in selective medium containing 20% fetal Clone Serum, 18% "653" conditioned media, 5% origen (IGEN), 4 mM L-glutamine, 1 mM L-glutamine, 1 mM sodium pyruvate, 5mM HEPES, 0.055 mM 2-mercaptoethanol, 50 units/ml penicillin, 50 mg/ml streptomycin, 50 mg/ml gentamycin and IX HAT (Sigma; the HAT is added 24 hours after the fusion). After two weeks, cells may be cultured in medium in which the HAT is replaced with HT. Individual wells may then be screened by ELISA for anti-TIGIT monoclonal IgG antibodies. Once extensive hybridoma growth occurs, medium can be observed usually after 10-14 days. The antibody secreting hybridomas may be replated, screened again, and if still positive for human IgG, anti- TIGIT monoclonal antibodies, can be subcloned at least twice by limiting dilution. The stable subclones may then be cultured in vitro to generate small amounts of antibody in tissue culture medium for characterization.

[0156] Thus, methods for making an anti-TIGIT antigen binding molecules (e.g., an anti-TIGIT antibody or antigen binding fragment thereof) are contemplated and comprise culturing a hybridoma cell that expresses the antigen binding molecule under conditions favorable to such expression and, optionally, isolating the antigen binding molecule from the hybridoma and/or the growth medium (e.g. cell culture medium).

[0157] The anti-TIGIT antigen binding molecules disclosed herein may also be produced recombinantly (e.g., in an E. coli/YI expression system, a mammalian cell expression system or a lower eukaryote expression system). In some embodiments, nucleic acids encoding the antibody immunoglobulin molecules (e.g., VH or VL or the relevant CDRs) may be inserted into a pET-based plasmid and expressed in the E. coli/T7 system. For

example, methods for expressing an antigen binding molecule or immunoglobulin chain thereof in a host cell (e.g., bacterial host cell such as E.coli such as BL21 or BL21DE3) comprise expressing T7 RNA polymerase in the cell which also includes a polynucleotide encoding an immunoglobulin chain that is operably linked to a T7 promoter. For example, a bacterial host cell, such as a E. coli, includes a polynucleotide encoding the T7 RNA polymerase gene operably linked to a lac promoter and expression of the polymerase and the chain is induced by incubation of the host cell with IPTG (isopropyl-beta-D-thiogalactopyranoside).

[0158] There are several methods by which to produce recombinant antibodies which are known in the art. One example of a method for recombinant production of antibodies is disclosed in U.S. Patent No. 4,816,567.

[0159] Transformation can be achieved by any known method for introducing polynucleotides into a host cell. Methods for introduction of heterologous polynucleotides into mammalian cells are well known in the art and include dextran-mediated transfection, calcium phosphate precipitation, polybrene-mediated transfection, protoplast fusion, electroporation, encapsulation of the polynucleotide(s) in liposomes, biolistic injection and direct microinjection of the DNA into nuclei. In addition, nucleic acid molecules may be introduced into mammalian cells by viral vectors. Methods of transforming cells are well known in the art. See, for example, U.S. Patent Nos. 4,399,216; 4,912,040; 4,740,461 and 4,959,455.

[0160] In some embodiments, recombinant methods for making an anti-TIGIT antigen binding molecules, or an immunoglobulin chain thereof, comprise introducing a polynucleotide encoding one or more immunoglobulin chains of the antigen binding molecule (e.g., heavy and/or light immunoglobulin chain); culturing the host cell (e.g., CHO or Pichia or Pichia pastoris) under condition favorable to such expression and, optionally, isolating the antigen binding molecule or chain from the host cell and/or medium in which the host cell is grown. Anti-TIGIT antigen binding molecules can also be synthesized by any of the methods set forth in U.S. Patent No. 6,331,415.

[0161] Eukaryotic and prokaryotic host cells, including mammalian cells as hosts for expression of the antigen binding molecules (including immunoglobulin chains) disclosed

herein are well known in the art and include many immortalized cell lines available from the American Type Culture Collection (ATCC). These include, inter alia, Chinese hamster ovary (CHO) cells, NSO, SP2 cells, HeLa cells, baby hamster kidney (BHK) cells, monkey kidney cells (COS), human hepatocellular carcinoma cells (e.g., Hep G2), A549 cells, 3T3 cells, HEK-293 cells and a number of other cell lines. Mammalian host cells include human, mouse, rat, dog, monkey, pig, goat, bovine, horse and hamster cells. Cell lines of particular preference are selected through determining which cell lines have high expression levels. Other cell lines that may be used are insect cell lines, such as Sf9 cells, amphibian cells, bacterial cells, plant cells and fungal cells. Fungal cells include yeast and filamentous fungus cells including, for example, Pichia pastoris, Pichia finlandica, Pichia trehalophila, Pichia koclamae, Pichia membranaefaciens, Pichia minuta (Ogataea minuta, Pichia lindneri), Pichia opuntiae, Pichia thermotolerans, Pichia salictaria, Pichia guercuum, Pichia pijperi, Pichia stiptis, Pichia methanolica, Pichia sp., Saccharomyces cerevisiae, Saccharomyces sp., Hansenula polymorpha, Kluyveromyces sp., Kluyveromyces lactis, Candida albicans, Aspergillus nidulans, Aspergillus niger, Aspergillus oryzae, Trichoderma reesei, Chrysosporium lucknowense, Fusarium sp., Fusarium gramineum, Fusarium venenatum, Physcomitrella patens and Neurospora crassa. Pichia sp., any Saccharomyces sp., Hansenula polymorpha, any Kluyveromyces sp., Candida albicans, any Aspergillus sp., Trichoderma reesei, Chrysosporium lucknowense, any Fusarium sp., Yarrowia lipolytica, and Neurospora crassa. When recombinant expression vectors encoding the heavy chain or antigen-binding portion or fragment thereof, the light chain and/or antigen-binding fragment thereof are introduced into mammalian host cells, the antigen binding molecules are produced by culturing the host cells for a period of time sufficient to allow for expression of the antigen binding molecule or chain in the host cells or secretion of the into the culture medium in which the host cells are grown.

[0162] Antigen binding molecules and immunoglobulin chains can be recovered from the culture medium using standard protein purification methods. Further, expression of antigen binding molecules (including immunoglobulin chains (or other moieties therefrom)) from production cell lines can be enhanced using a number of known techniques. For example, the glutamine synthetase gene expression system (the GS system) is a common

approach for enhancing expression under certain conditions. The GS system is discussed in whole or part in connection with European Patent Nos. 0 216 846, 0 256 055, and 0 323 997 and European Patent Application No. 89303964.4. Thus, in some embodiments, the mammalian host cells {e.g., CHO) lack a glutamine synthetase gene and are grown in the absence of glutamine in the medium wherein, however, the polynucleotide encoding the immunoglobulin chain comprises a glutamine synthetase gene which complements the lack of the gene in the host cell.

[0163] Methods for purifying an anti-TIGIT antigen binding molecule can comprise introducing a sample comprising the antigen binding molecule to a purification medium (e.g., cation exchange medium, anion exchange medium, hydrophobic exchange medium, affinity purification medium (e.g. , protein-A, protein-G, protein-A/G, protein-L)) and either collecting purified antigen binding molecule from the flow-through fraction of said sample that does not bind to the medium; or, discarding the flow-through fraction and eluting bound antigen binding molecule from the medium and collecting the eluate. In some embodiments, the medium is in a column to which the sample is applied. In some embodiments, the purification method is conducted following recombinant expression of the antigen binding molecule in a host cell, e.g. , wherein the host cell is first lysed and, optionally, the lysate is purified of insoluble materials prior to purification on a medium.

[0164] In general, glycoproteins produced in a particular cell line or transgenic animal will have a glycosylation pattern that is characteristic for glycoproteins produced in the cell line or transgenic animal. Therefore, the particular glycosylation pattern of an antibody will depend on the particular cell line or transgenic animal used to produce the antibody. In some embodiments, antibodies with a glycosylation pattern comprising only non-fucosylated N-glycans may be advantageous, because these antibodies have been shown to typically exhibit more potent efficacy than their fucosylated counterparts both in vitro and in vivo {See for example, Shinkawa et al., J. Biol. Chem. 278: 3466-3473 (2003); U.S. Patent Nos. 6,946,292 and 7,214,775). These antibodies with non- fucosylated N-glycans are not likely to be immunogenic because their carbohydrate structures are a normal component of the population that exists in human serum IgG.

[0165] Provided herein are polyclonal anti-TIGIT antibodies and antigen-binding fragments thereof, e.g., a composition comprising a plurality of anti-TIGIT antibodies and fragments, which include one or more of the anti-TIGIT antibodies or antigen-binding fragments thereof. A polyclonal antibody is an antibody which was produced among or in the presence of one or more other, non-identical antibodies. In general, polyclonal antibodies are produced from collections of different B- lymphocytes, e.g., the B-lymphocyte of an animal treated with an immunogen of interest, which produces a population of different antibodies but which are all directed to the immunogen. Usually, polyclonal antibodies are obtained directly from an immunized animal, e.g., spleen, serum or ascites fluid.

[0166] The antigen binding molecules disclosed herein (e.g., an antigen binding molecule that includes one or more of the sequences in FIGs. 2A-3C) also include antigen binding molecules with modified (or blocked) Fc regions to provide altered effector functions. See, e.g., U.S. Pat. No. 5,624,821; WO2003/086310; WO2005/120571; WO2006/0057702. Such modifications can be used to enhance or suppress various reactions of the immune system, with possible beneficial effects in diagnosis and therapy. Alterations of the Fc region include amino acid changes (substitutions, deletions and insertions), glycosylation or deglycosylation, and adding multiple Fc regions. Changes to the Fc can also alter the half-life of antigen binding molecules in therapeutic antigen binding molecules, enabling less frequent dosing and thus increased convenience and decreased use of material. See Presta (2005) J. Allergy Clin. Immunol. 116:731 at 734-35.

[0167] In some embodiments, the Fc region of an anti-TIGIT antibody is modified to increase the ability of the antibody or antigen-binding fragment to mediate effector function and/or to increase their binding to the Fcgamma receptors (FcyRs).

[0168] The term "Effector Function" as used herein is meant to refer to one or more of Antibody Dependant Cell mediated Cytotoxic activity (ADCC), Complement-dependant cytotoxic activity (CDC) mediated responses, Fc-mediated phagocytosis or antibody dependant cellular phagocytosis (ADCP) and antibody recycling via the FcRn receptor.

[0169] The interaction between the constant region of an antigen binding protein and various Fc receptors (FcR) including FcgammaRI (CD64), FcgammaRII (CD32) and

FcgammaRIII (CD 16) is believed to mediate the effector functions, such as ADCC and CDC, of the antigen binding protein. The Fc receptor is also important for antibody cross-linking, which can be important for anti-tumor immunity.

[0170] Effector function can be measured in a number of ways including for example via binding of the FcgammaRIII to Natural Killer cells or via FcgammaRI to monocytes/macrophages to measure for ADCC effector function. For example an antigen binding protein can be assessed for ADCC effector function in a Natural Killer cell assay. Examples of such assays can be found in Shields et al, 2001 J. Biol. Chem., Vol. 276, p 6591-6604; Chappel et al, 1993 J. Biol. Chem., Vol 268, p 25124-25131; Lazar et al, 2006 PNAS, 103; 4005-4010.

[0171] The ADCC or CDC properties of antibodies, or their cross- linking properties, may be enhanced in a number of ways.

[0172] Human IgGl constant regions containing specific mutations or altered glycosylation on residue Asn297 have been shown to enhance binding to Fc receptors. In some cases these mutations have also been shown to enhance ADCC and CDC (Lazar et al. PNAS 2006, 103; 4005-4010; Shields et al. J Biol Chem 2001, 276; 6591-6604; Nechansky et al. Mol Immunol, 2007, 44; 1815-1817).

[0173] In some embodiments, such mutations are in one or more of positions selected from 239, 332 and 330 (IgGl), or the equivalent positions in other IgG isotypes. Examples of suitable mutations are S239D and I332E and A330L. In some embodiments, the antibody herein described is mutated at positions 239 and 332, for example S239D and I332E or in a further embodiment it is mutated at three or more positions selected from 239 and 332 and 330, for example S239D and I332E and A330L. (EU index numbering).

[0174] In some embodiments, there is provided an antibody comprising a heavy chain constant region with an altered glycosylation profile such that the antigen binding protein has enhanced effector function. For example, wherein the antibody has enhanced ADCC or enhanced CDC or wherein it has both enhanced ADCC and CDC effector function. Examples of suitable methodologies to produce antigen binding proteins with an altered glycosylation profile are described in WO2003011878, WO2006014679 and EP1229125.

Kits

[0175] Further provided are kits comprising one or more components that include, but are not limited to, an anti-TIGIT antigen binding molecule (e.g., an antibody or antigen binding fragment thereof, that includes one or more of the sequences in FIGs. 2A-3C) in association with one or more additional components including, but not limited to a pharmaceutically acceptable carrier and/or a therapeutic agent. The antigen binding molecule and/or the therapeutic agent can be formulated as a pure composition or in combination with a pharmaceutically acceptable carrier, in a pharmaceutical composition.

[0176] In some embodiments, a kit for determining the presence of human TIGIT is provided. The kit can comprise an isolated antigen binding molecule or isolated antibody as provided herein and a detectable marker.

[0177] In some embodiments, the kit includes an anti-TIGIT antigen binding molecule (e.g., an antibody or antigen binding fragment thereof, that includes one or more of the sequences in FIGs. 2A-3C) or a pharmaceutical composition thereof in one container (e.g., in a sterile glass or plastic vial) and a pharmaceutical composition thereof and/or a therapeutic agent in another container (e.g., in a sterile glass or plastic vial).

[0178] In some embodiments, the kit comprises a combination, including an anti-TIGIT antigen binding molecule (e.g., an antibody or antigen binding fragment thereof that includes one or more of the sequences in FIGs. 2A-3C) along with a pharmaceutically acceptable carrier, optionally in combination with one or more therapeutic agents formulated together, optionally, in a pharmaceutical composition, in a single, common container.

[0179] If the kit includes a pharmaceutical composition for parenteral administration to a subject, the kit can include a device for performing such administration. For example, the kit can include one or more hypodermic needles or other injection devices as discussed above.

[0180] The kit can include a package insert including information concerning the pharmaceutical compositions and dosage forms in the kit. Generally, such information aids patients and physicians in using the enclosed pharmaceutical compositions and dosage forms effectively and safely. For example, the following information regarding a combination of the antigen binding molecule can be supplied in the insert: pharmacokinetics,

pharmacodynamics, clinical studies, efficacy parameters, indications and usage, contraindications, warnings, precautions, adverse reactions, overdosage, proper dosage and administration, how supplied, proper storage conditions, references, manufacturer/distributor information and patent information.

EXAMPLES

Example 1

Biochemical Binding Assays

[0181] Binding affinities for antigen binding to anti-TIGIT monoclonal antibodies were determined by ELISA. His-tagged recombinant proteins, Mouse or Human TIGIT were coated on Immunolon 384-well plates at a concentration of 0.5 μg/mL in 1x coating buffer. Antibodies to be tested were diluted to 1 μM in PBS buffer containing 1% BSA and diluted 3-fold in a 10-point curve. Detection of the antibody binding to the antigen was performed using biotinylated goat anti-human kappa light chain. Detection of the secondary antibody was determined using streptavidin-HRP and TMB reagent. All assays were performed at room temperature. Curve-fitting software was used to determine the EC_{50} for each antibody. Data from these assays is shown in Tables 1.1-1.3. Lower values indicate superior binding activity and the units are in microM.

Table 1.1 (ARE)

clone	Goat anti-HuKappa	ELISA-Human TIGIT, 10pt	ELISA-Mouse TIGIT, 10pt
Ab58	3.647	0.6869	0.1695
Ab69	3.774	>1μM	>1μM
Ab75	3.778	>1μM	>1μM
Ab133	3.902	>1μM	>1μM
Ab177	3.525	0.0283	0.4387
Ab122	3.937	0.1347	>1μM
Ab86	3.753	0.2643	0.0838
Ab180	3.741	0.0223	0.0784
Ab83	3.959	inconclusive	inconclusive
Ab26	3.813	0.0533	0.0475
Ab20	3.602	0.033	0.0327
Ab147	3.893	>1μM	>1μM

clone	Goat anti-HuKappa	ELISA-Human TIGIT, 10pt	ELISA-Mouse TIGIT, 10pt
Ab12	3.724	0.0277	>1μM
Ab66	3.825	0.2596	>1μM
Ab176	3.61	0.0206	0.1871
Ab96	3.852	0.2106	0.3444
Ab123	3.936	0.43	0.5777
Ab109	3.955	>1μM	>1μM
Ab149	3.175	>1μM	0.052
Ab34	3.638	0.0087	0.105
Ab61	3.842	0.1125	>1μM
Ab64	3.851	0.229	inconclusive
Ab105	3.887	>1μM	>1μM
Ab108	3.914	0.8345	0.6831
Ab178	3.554	0.0061	0.024
Ab166	3.613	0.0041	0.0104
Ab29	3.788	0.0097	0.041
Ab135	3.873	0.0254	0.0252
Ab171	3.386	0.0346	0.0864
Ab194	3.347	0.0259	0.0706
Ab184	3.397	0.0143	0.0575
Ab164	3.385	0.0154	0.2894
Ab183	3.504	0.0057	0.1102
Ab158	2.994	>1μM	0.1565
Ab55	3.749	1.023	0.2907
Ab136	3.962	0.1768	>1μM
Ab39	3.736	0.0327	0.0803
Ab159	3.076	0.3846	0.1161
Ab151	3.308	0.3766	0.1758
Ab139	3.959	0.1302	0.1246
Ab107	3.845	>1μM	inconclusive
Ab36	3.713	0.0628	0.47
Ab193	3.465	0.0046	>1μM
Ab115	3.936	>1μM	>1μM
Ab106	3.94	0.2288	0.1248
Ab138	3.743	0.234	0.0586
Ab127	3.732	>1μM	>1μM
Ab165	3.672	0.0128	0.2285
Ab155	3.325	0.0328	0.234

clone	Goat anti-HuKappa	ELISA-Human TIGIT, 10pt	ELISA-Mouse TIGIT, 10pt
Ab19	3.703	0.0198	0.0648
Ab6	3.698	0.0254	>1μM
Ab187	3.356	0.0062	>1μM
Ab179	3.418	0.155	0.228
Ab65	3.709	>1μM	0.778
Ab114	4.018	>1μM	>1μM
Ab102	3.927	>1μM	>1μM
Ab94	4.036	0.0893	0.058
Ab163	3.661	0.0492	0.3167
Ab110	3.785	0.065	0.0619
Ab80	3.885	0.8983	0.478
Ab92	3.859		
Ab117	3.835	0.0017	0.0107
Ab162	3.398	0.0018	0.0204
Ab121	3.976	>1μM	>1μM
Ab195	3.507	0.0441	0.1059
Ab84	4.008	0.3919	0.2207
Ab161	3.394	0.1222	0.4079
Ab198	3.528	0.0214	0.0691
Ab24	3.462	0.0359	0.2545
Ab98	3.95	0.0366	0.0219
Ab116	3.845	0.4443	>1μM
Ab174	3.723	0.0145	0.1727
Ab196	3.654	0.0037	0.0195
Ab51	3.03	0.0972	0.0798
Ab91	3.977	inconclusive	0.242
Ab185	3.343	0.0817	0.1013
Ab23	3.719	0.289	0.0744
Ab7	3.521	0.0146	0.0115
Ab95	3.867	0.3572	0.1001
Ab100	3.756	inconclusive	0.2575
Ab140	3.776	inconclusive	0.1734
Ab145	3.946	0.2325	0.0504
Ab150	2.646	>1μM	0.0007
Ab168	3.143	0.4759	0.2526
Ab54	3.744	0.0919	0.0215
Ab77	3.792		0.1114

clone	Goat anti-HuKappa	ELISA-Human TIGIT, 10pt	ELISA-Mouse TIGIT, 10pt
Ab43	3.195	0.0479	0.0172
Ab160	3.134	0.4041	0.0264
Ab82	3.882	inconclusive	0.0615
Ab189	3.353	0.0364	0.0529
Ab17	3.576	0.0147	0.014
Ab103	3.926	5000	inconclusive
Ab18	3.731	0.0453	0.049
Ab130	3.844	inconclusive	0.432
Ab132	3.799	>1μM	0.3113
Ab134	3.998	>1μM	0.343
Ab144	3.863	>1μM	0.315

Table 1.2 (ARG)

clone	Goat anti-HuKappa	ELISA-Human TIGIT, 10pt	ELISA-Mouse TIGIT, 10pt
Ab2	3.335	0.0157	>1μM
Ab47	3.058	0.0349	0.3614
Ab49	3.297	0.0276	0.058
Ab31	3.724	0.0125	0.0569
Ab53	3.183	0.0043	0.0076
Ab40	2.531	0.0003	>1μM
Ab5	3.59	0.0101	0.322
Ab9	3.618	0.0326	0.1814
Ab48	3.02	0.0138	0.0418
Ab4	3.462	0.0012	>1μM
Ab10	3.547	0.1011	0.0407
Ab37	3.819	0.0408	0.2208
Ab33	3.716	0.025	0.0854
Ab42	3.012	0.0765	0.0605
Ab45	3.226	0.0354	0.048

Table 1.3 (ARV)

clone	Goat anti-HuKappa	ELISA-Human TIGIT, 10pt	ELISA-Mouse TIGIT, 10pt
Ab44	3.253	0.0135	0.1281
Ab97	3.763	0.2887	>1μM
Ab81	3.878	0.0495	0.3073
Ab188	3.166	0.0093	0.0403
Ab186	3.497	0.0207	0.429
Ab62	3.665	>1μM	0.3612
Ab57	3.839	0.1454	0.3054
Ab192	3.463	0.0124	0.2952
Ab73	3.736	>1μM	0.2659
Ab60	3.778	0.0798	inconclusive
Ab28	3.701	0.0075	0.0287
Ab32	3.648	0.0043	0.0147
Ab78	3.779	0.119	>1μM
Ab14	3.723	0.0201	0.1694
Ab152	3.518	0.0271	>1μM
Ab72	3.853	0.0817	0.2347
Ab137	3.973	inconclusive	0.0849
Ab128	3.779	inconclusive	0.2646
Ab169	3.491	0.1527	0.1099
Ab87	3.783	inconclusive	0.2304
Ab74	3.757	0.1768	0.0419
Ab172	3.357	0.0832	0.1078
Ab153	3.255	0.0877	0.0139
Ab120	3.849	>1μM	0.2542
Ab13	3.51	0.0431	0.0592
Ab113	3.941	inconclusive	inconclusive
Ab16	3.609	0.0036	0.0049
Ab56	3.687		0.0196
Ab129	3.847	>1μM	>1μM
Ab50	3.191	0.0447	0.0178
Ab90	3.897	inconclusive	0.2034
Ab99	3.938	0.1757	0.05
Ab3	3.422	0.0586	>1μM
Ab148	4.042	0.1681	0.0164
Ab124	3.905	0.0343	0.0141
Ab22	3.684	0.0091	0.0051

clone	Goat anti-HuKappa	ELISA-Human TIGIT, 10pt	ELISA-Mouse TIGIT, 10pt
Ab41	3.025	0.011	0.0095
Ab119	3.981	inconclusive	0.2786
Ab157	3.001	0.1654	0.1161
Ab27	3.554	0.0127	0.0177
Ab15	3.697	0.005	0.0084
Ab191	3.448	0.0449	0.1044
Ab190	3.543	0.0021	0.0234
Ab79	3.88	0.0278	0.0866
Ab181	3.258		
Ab146	3.967	0.0076	0.0078
Ab167	3.475	0.0126	0.0612
Ab88	3.986	0.149	0.4074
Ab199	3.308	0.0018	0.081
Ab71	3.738	>1μM	0.477
Ab85	4.014	>1μM	0.6825
Ab59	3.779	>1μM	>1μM
Ab141	3.74	0.1766	0.1233
Ab68	3.904	0.639	>1μM
Ab143	3.89	0.0034	0.0057
Ab46	3.418	0.0082	0.095
Ab197	3.462	0.0111	0.0814
Ab175	3.684	0.0052	0.0393
Ab156	3.312	>1μM	0.1645
Ab63	3.732	0.0919	0.1785
Ab11	3.69	0.0902	0.3594
Ab182	3.334	0.1813	0.1997
Ab89	3.869	inconclusive	inconclusive
Ab8	3.699	0.106	0.1493
Ab101	3.89	inconclusive	0.535
Ab25	3.504	0.0135	0.0209
Ab154	3.347	0.0908	0.1218
Ab21	3.699	0.202	0.1467
Ab111	3.795	inconclusive	0.1855
Ab118	3.989	0.392	0.1096
Ab173	3.395	0.0457	0.0649
Ab38	3.65	0.0455	>1μM

clone	Goat anti-HuKappa	ELISA-Human TIGIT, 10pt	ELISA-Mouse TIGIT, 10pt
Ab76	3.949	0.0681	0.0657
Ab131	3.917	0.0072	0.3313
Ab1	4	0.0403	0.1807
Ab67	3.791	>1μM	>1μM
Ab70	3.896	>1μM	>1μM
Ab170	3.581	0.1379	>1μM
Ab30	3.67	0.0157	0.1353
Ab93	4.019	0.1221	>1μM
Ab142	3.836	0.1085	>1μM
Ab104	3.899	>1μM	>1μM
Ab112	3.955	0.7522	0.2131
Ab35	3.811	0.0312	0.3566
Ab126	3.889	0.2034	0.0641
Ab125	3.977	0.1273	0.1505

EXAMPLE 2

BIOCHEMICAL COMPETITIVE BINDING

[0182] The ability of the antibodies to block polio virus receptor (PVR; aka CD155) binding to the human or the mouse TIGIT extra cellular domain (TIGIT-ECD) was assessed by ELISA. PVR was coated on 384-well Immunolon plates in coating buffer at 0.5 μg/mL. Antibodies were serially diluted in a 10-point curve starting at 1 μM in 3-fold steps. Human TIGIT proteins were biotinylated using the EZ-Link NHS-PEG4-biotin kit (Thermo Fisher). The antibodies were pre-incubated with biotinylated human TIGIT or mouse TIGIT-Fc at a concentration of 500 ng/mL in 1% BSA in PBST for 1 hour. The mixtures of antibodies and receptors were added to the PVR-coated plates for 1 hour. The inhibition of ligand-receptor interaction for the human TIGIT was detected with streptavidin-HRP at a concentration of 10 ng/mL and TMB. The inhibition of ligand-receptor interaction for the

mouse TIGIT was detected by ELISA. Data from these binding assays is shown in Tables 2.1-2.3. Units are in microM.

Table 2.1 (ARE)

clone	Competitive ELISA- Human TIGIT, 10pt	Competitive ELISA- Mouse TIGIT, 10pt
Ab58	0.1382	0.2384
Ab69	0.9167	>1μM
Ab75	0.2715	1.857
Ab133	1.254	>1μM
Ab177	0.1303	0.2831
Ab122	0.7483	>1μM
Ab86	0.1243	0.3617
Ab180	0.1276	0.1949
Ab83	inconclusive	0.9737
Ab26	0.2748	0.2356
Ab20	0.1557	0.1801
Ab147	>1μM	>1μM
Ab12	0.0934	>1μM
Ab66	0.279	0.3091
Ab176	0.1252	0.1697
Ab96	0.1926	0.4967
Ab123	0.2292	1.944
Ab109	0.4441	1.305
Ab149	>1μM	0.0471
Ab34	0.0552	0.5826
Ab61	0.3977	0.8403
Ab64	0.1249	0.3621
Ab105	0.573	1.916
Ab108	0.6936	2.819
Ab178	0.04	0.0591
Ab166	0.0226	0.028
Ab29	0.0493	0.2798
Ab135	0.1447	0.0865
Ab171	0.1697	0.1323
Ab194	0.155	0.2223
Ab184	0.1058	0.1206

clone	Competitive ELISA-Human TIGIT, 10pt	Competitive ELISA-Mouse TIGIT, 10pt
Ab164	0.0753	0.1047
Ab183	0.0751	0.1144
Ab158	>1μM	0.1315
Ab55	0.255	0.3675
Ab136	>1μM	0.9557
Ab39	0.1213	0.1891
Ab159	0.5386	0.2718
Ab151	0.4453	0.6308
Ab139	0.249	2.148
Ab107	5000	5000
Ab36	0.1261	0.8038
Ab193	0.093	>1μM
Ab115	0.6072	>1μM
Ab106	0.2179	0.1886
Ab138	0.1772	0.252
Ab127	0.8486	0.4914
Ab165	0.0891	0.1888
Ab155	0.203	0.5006
Ab19	0.0735	0.1839
Ab6	0.0639	0.5111
Ab187	0.0817	0.1319
Ab179	0.3039	0.3944
Ab65	0.435	0.4874
Ab114	0.4728	>1μM
Ab102	0.4836	0.7866
Ab94	0.1157	0.0847
Ab163	0.2119	0.1305
Ab110	0.1659	0.1999
Ab80	0.2575	0.2643
Ab92		
Ab117	0.0385	0.0234
Ab162	0.0433	0.0283
Ab121	0.41	2.066
Ab195	0.2459	0.301
Ab84	0.1373	0.257
Ab161	0.372	0.8733

clone	Competitive ELISA-Human TIGIT, 10pt	Competitive ELISA-Mouse TIGIT, 10pt
Ab198	0.1292	0.2535
Ab24	0.1175	1.024
Ab98	0.0447	0.0593
Ab116	0.704	>1μM
Ab174	0.1075	0.085
Ab196	0.0493	0.0452
Ab51	0.0754	0.3106
Ab91	inconclusive	0.4574
Ab185	0.3398	0.1977
Ab23	0.0931	0.1432
Ab7	0.0598	0.0568
Ab95	0.526	0.2019
Ab100	5000	inconclusive
Ab140	0.6338	0.4787
Ab145	0.4258	0.3346
Ab150	>1μM	0.0046
Ab168	0.8658	0.2572
Ab54	0.1124	0.0729
Ab77	0.5447	0.4125
Ab43	0.1965	0.0608
Ab160	0.4074	0.2125
Ab82	0.5809	0.1076
Ab189	0.1396	0.1408
Ab17	0.0529	0.0458
Ab103	inconclusive	1.114
Ab18	0.1906	0.1878
Ab130	>1μM	5000
Ab132	>1μM	0.771
Ab134	>1μM	0.8851
Ab144	>1μM	1.09

Table 2.2 (ARG)

clone	Competitive ELISA-Human TIGIT, 10pt	Competitive ELISA-Mouse TIGIT, 10pt

Ab2	0.038	>1μM
Ab47	0.4918	0.3799
Ab49	0.158	0.2649
Ab31	0.0502	0.2728
Ab53	0.009	0.0353
Ab40	0.0038	>1μM
Ab5	0.0357	0.3774
Ab9	0.0911	1.005
Ab48	0.1106	0.0647
Ab4	0.0059	>1μM
Ab10	0.071	0.0688
Ab37	0.1471	0.2166
Ab33	0.0826	0.5685
Ab42	0.1988	0.1124
Ab45	0.1	0.1219

Table 2.3 (ARV)

clone	Competitive ELISA-Human TIGIT, 10pt	Competitive ELISA-Mouse TIGIT, 10pt
Ab44	0.0416	0.2812
Ab97	0.232	1.107
Ab81	0.062	0.3523
Ab188	0.0456	0.1
Ab186	0.1016	0.885
Ab62	0.2667	0.9408
Ab57	0.0566	0.1306
Ab192	0.1592	0.5436
Ab73	0.0999	1.219
Ab60	0.0464	0.2728
Ab28	0.0248	0.1435
Ab32	0.0134	0.0507
Ab78	0.1277	1.836
Ab14	0.059	0.8418
Ab152	0.1067	1.095
Ab72	0.4462	0.2266
Ab137	inconclusive	0.2111

clone	Competitive ELISA-Human TIGIT, 10pt	Competitive ELISA-Mouse TIGIT, 10pt
Ab128	inconclusive	0.3249
Ab169	0.4434	0.1726
Ab87	inconclusive	0.3725
Ab74	0.1058	0.0589
Ab172	0.3863	0.1174
Ab153	0.1494	0.0691
Ab120	0.457	0.3177
Ab13	0.1233	0.1482
Ab113	inconclusive	1.026
Ab16	0.0159	0.0258
Ab56	0.0997	0.1266
Ab129	>1μM	0.1293
Ab50	0.0397	0.0466
Ab90	0.3526	0.2541
Ab99	0.1653	0.0807
Ab3	0.0235	>1μM
Ab148	0.1738	0.1201
Ab124	0.2217	0.0856
Ab22	0.018	0.0242
Ab41	0.0764	0.0447
Ab119	inconclusive	0.3888
Ab157	0.4347	0.5118
Ab27	0.047	0.0518
Ab15	0.022	0.04
Ab191	0.2782	0.2256
Ab190	0.037	0.0432
Ab79	0.0543	0.0334
Ab181		
Ab146	0.0453	0.0361
Ab167	0.0885	0.0682
Ab88	0.6681	1.364
Ab199	0.0464	0.1109
Ab71	0.1221	0.5911
Ab85	0.141	0.1534
Ab59	>1μM	>1μM
Ab141	0.215	0.2806

clone	Competitive ELISA-Human TIGIT, 10pt	Competitive ELISA-Mouse TIGIT, 10pt
Ab68	0.2926	0.5568
Ab143	0.0203	0.022
Ab46	0.1883	0.1185
Ab197	0.1104	0.1045
Ab175	0.042	0.0533
Ab156	>1μM	0.0653
Ab63	0.2041	0.1838
Ab11	0.1969	0.3391
Ab182	0.5126	0.5807
Ab89	inconclusive	0.9985
Ab8	0.3472	0.4284
Ab101	inconclusive	5000
Ab25	0.047	0.0602
Ab154	0.3326	0.2508
Ab21	0.1282	0.3154
Ab111	0.4407	0.7051
Ab118	0.6052	0.3567
Ab173	0.1468	0.1674
Ab38	0.08	>1μM
Ab76	0.1274	0.0896
Ab131	0.1713	0.116
Ab1	0.0899	0.6317
Ab67	0.6037	2.581
Ab70	0.4496	1.891
Ab170	0.4011	0.4345
Ab30	0.084	0.3441
Ab93	0.4337	0.9349
Ab142	0.6591	2.169
Ab104	2.364	1.555
Ab112	0.293	0.3211
Ab35	0.1199	0.4375
Ab126	0.3398	0.1827
Ab125	0.1111	1.395

EXAMPLE 3

INHIBITION OF GRB2 RECRUITMENT ASSAY (COMPETITIVE BINDING)

[0183] YTS cells (NK cell line) were engineered to express human TIGIT fused to the Alpha portion of beta galactosidase (beta gal) and Grb2 fused to the complementary omega portion of beta gal (or vice versa) (YTS_TIGIT/Grb2). 721.221 cells (B-cell line) were engineered to express PVR (221_PVR). Binding of PRV with TIGIT increases recruitment of Grb2 to TIGIT in the YTS cells. YTS cells were plated and then incubated with serial dilutions of antibody for 1.5 hours at 37 degrees C. 221_PVR cells were then added to the YTS cells and co-cultured overnight (16-24 hours). The extent of TIGIT binding with Grb2 was detected using a chemiluminescence beta gal staining kit and read on a fluorescence plate reader to assess reconstitution of active beta gal enzyme. The ratio of Grb2-TIGIT binding in the absence and presence of antibody was calculated to determine IC50 of inhibition of Grb2 recruitment. Data from these inhibition assays is shown in Tables 3.1-3.4 and units are in microM.

Table 3.1 (ARE)

clone	YTS_hTIGI/hGrbs_EFC_Antagonism, YTS_hTIGIT/hGrb2, 221_hPVR/ICAM, 11pt
Ab58	
Ab69	
Ab75	
Ab133	
Ab177	
Ab122	
Ab86	
Ab180	
Ab83	
Ab26	
Ab20	
Ab147	
Ab12	
Ab66	

clone	YTS_hTIGI/hGrbs_EFC_Antagonism, YTS_hTIGIT/hGrb2, 221_hPVR/ICAM, 11pt
Ab176	
Ab96	
Ab123	
Ab109	
Ab149	
Ab34	
Ab61	
Ab64	
Ab105	
Ab108	
Ab178	0.3616
Ab166	0.0212
Ab29	
Ab135	
Ab171	
Ab194	
Ab184	
Ab164	
Ab183	
Ab158	
Ab55	
Ab136	
Ab39	
Ab159	
Ab151	
Ab139	
Ab107	
Ab36	
Ab193	
Ab115	
Ab106	
Ab138	
Ab127	
Ab165	
Ab155	
Ab19	

clone	YTS_hTIGI/hGrbs_EFC_Antagonism, YTS_hTIGIT/hGrb2, 221_hPVR/ICAM, 11pt
Ab6	
Ab187	
Ab179	
Ab65	
Ab114	
Ab102	
Ab94	
Ab163	
Ab110	
Ab80	
Ab92	
Ab117	
Ab162	0.3645
Ab121	
Ab195	
Ab84	
Ab161	
Ab198	
Ab24	
Ab98	
Ab116	
Ab174	
Ab196	
Ab51	
Ab91	
Ab185	
Ab23	
Ab7	
Ab95	
Ab100	
Ab140	
Ab145	
Ab150	
Ab168	
Ab54	
Ab77	

clone	YTS_hTIGI/hGrbs_EFC_Antagonism, YTS_hTIGIT/hGrb2, 221_hPVR/ICAM, 11pt
Ab43	
Ab160	
Ab82	
Ab189	
Ab17	
Ab103	
Ab18	
Ab130	
Ab132	
Ab134	
Ab144	

Table 3.2 (ARG)

clone	YTS_hTIGI/hGrbs_EFC_Antagonism, YTS_hTIGIT/hGrb2, 221_hPVR/ICAM, 11pt
Ab2	
Ab47	
Ab49	
Ab31	
Ab53	0.0303
Ab40	0.0023
Ab5	
Ab9	
Ab48	
Ab4	0.0922
Ab10	
Ab37	
Ab33	
Ab42	
Ab45	

Table 3.3 (ARV)

clone	YTS_hTIGIT/hGrbs_EFC_Antagonism, YTS_hTIGIT/hGrb2, 221_hPVR/ICAM, 11pt
Ab44	
Ab97	
Ab81	
Ab188	
Ab186	
Ab62	
Ab57	
Ab192	
Ab73	
Ab60	
Ab28	0.2034
Ab32	1.407
Ab78	
Ab14	
Ab152	
Ab72	
Ab137	
Ab128	
Ab169	
Ab87	
Ab74	
Ab172	
Ab153	
Ab120	
Ab13	
Ab113	
Ab16	1.744
Ab56	
Ab129	
Ab50	
Ab90	
Ab99	
Ab3	0.1131
Ab148	
Ab124	
Ab22	0.6079
Ab41	

clone	YTS_hTIGIT/hGrbs_EFC_Antagonism, YTS_hTIGIT/hGrb2, 221_hPVR/ICAM, 11pt
Ab119	
Ab157	
Ab27	
Ab15	
Ab191	
Ab190	
Ab79	
Ab181	
Ab146	
Ab167	
Ab88	
Ab199	
Ab71	
Ab85	
Ab59	
Ab141	
Ab68	
Ab143	0.0602
Ab46	0.1593
Ab197	
Ab175	0.2877
Ab156	
Ab63	
Ab11	
Ab182	
Ab89	
Ab8	
Ab101	
Ab25	
Ab154	
Ab21	
Ab111	
Ab118	
Ab173	
Ab38	
Ab76	
Ab131	0.065

clone	YTS_hTIGIT/hGrbs_EFC_Antagonism, YTS_hTIGIT/hGrb2, 221_hPVR/ICAM, 11pt
Ab1	
Ab67	
Ab70	
Ab170	
Ab30	
Ab93	
Ab142	
Ab104	
Ab112	
Ab35	
Ab126	
Ab125	

EXAMPLE 4

CELL-BASED BINDING ASSAY (DIMERIZATION)

[0184] YTS cells were engineered to express both TIGIT fused to the alpha portion of a beta gal and TIGIT fused to the omega portion of a beta gal (YTS_TIGIT/TIGIT). YTS cells were plated and then incubated with serial dilutions of antibody for 1.5 hours at 37 degrees C. 221_PVR cells were then added to the YTS cells and co-cultured overnight (16-24 hours). The extent of TIGIT dimerization was detected using a chemiluminescence beta gal staining kit and read on a fluorescence plate reader to assess reconstitution of active beta gal enzyme. The ratio of TIGIT dimerization in the absence and presence of antibody was calculated to determine EC50 of induced dimerization. Data from these assays is shown in Tables 4.1-4.3 and units are in microM.

Table 4.1 (ARE)

clone	YTS_hTIGIT/hTIGIT_EFC, YTS_hTIGIT/hTIGIT, 11pt

clone	YTS_hTIGIT/hTIGIT_EFC, YTS_hTIGIT/hTIGIT, 11pt
Ab58	
Ab69	
Ab75	
Ab133	
Ab177	
Ab122	
Ab86	
Ab180	
Ab83	
Ab26	
Ab20	
Ab147	
Ab12	
Ab66	
Ab176	
Ab96	0.3209
Ab123	
Ab109	
Ab149	
Ab34	
Ab61	
Ab64	0.7377
Ab105	
Ab108	
Ab178	0.0487
Ab166	0.0147
Ab29	
Ab135	
Ab171	
Ab194	
Ab184	
Ab164	
Ab183	
Ab158	
Ab55	0.2214
Ab136	
Ab39	

clone	YTS_hTIGIT/hTIGIT_EFC, YTS_hTIGIT/hTIGIT, 11pt
Ab159	
Ab151	
Ab139	
Ab107	
Ab36	
Ab193	
Ab115	
Ab106	
Ab138	
Ab127	
Ab165	
Ab155	
Ab19	
Ab6	
Ab187	
Ab179	
Ab65	
Ab114	
Ab102	
Ab94	
Ab163	
Ab110	0.3595
Ab80	
Ab92	
Ab117	
Ab162	>1μM
Ab121	
Ab195	
Ab84	
Ab161	
Ab198	
Ab24	
Ab98	
Ab116	
Ab174	
Ab196	
Ab51	0.0408

clone	YTS_hTIGIT/hTIGIT_EFC, YTS_hTIGIT/hTIGIT, 11pt
Ab91	
Ab185	
Ab23	
Ab7	
Ab95	
Ab100	
Ab140	
Ab145	
Ab150	
Ab168	
Ab54	
Ab77	
Ab43	
Ab160	
Ab82	
Ab189	
Ab17	
Ab103	
Ab18	
Ab130	
Ab132	
Ab134	
Ab144	

Table 4.2 (ARG)

clone	YTS_hTIGIT/hTIGIT_EFC, YTS_hTIGIT/hTIGIT, 11pt
Ab2	
Ab47	
Ab49	
Ab31	
Ab53	0.0027
Ab40	0.0095
Ab5	
Ab9	

clone	YTS_hTIGIT/hTIGIT_EFC, YTS_hTIGIT/hTIGIT, 11pt
Ab48	0.4772
Ab4	
Ab10	0.0572
Ab37	
Ab33	
Ab42	
Ab45	

Table 4.3 (ARV)

clone	YTS_hTIGIT/hTIGIT_EFC, YTS_hTIGIT/hTIGIT, 11pt
Ab44	
Ab97	
Ab81	
Ab188	
Ab186	
Ab62	
Ab57	0.1528
Ab192	
Ab73	
Ab60	0.404
Ab28	
Ab32	
Ab78	
Ab14	
Ab152	
Ab72	
Ab137	
Ab128	
Ab169	
Ab87	
Ab74	0.0019
Ab172	
Ab153	
Ab120	

clone	YTS_hTIGIT/hTIGIT_EFC, YTS_hTIGIT/hTIGIT, 11pt
Ab13	
Ab113	
Ab16	
Ab56	
Ab129	
Ab50	
Ab90	0.0074
Ab99	0.154
Ab3	
Ab148	
Ab124	0.3928
Ab22	0.0403
Ab41	
Ab119	
Ab157	
Ab27	
Ab15	
Ab191	
Ab190	
Ab79	
Ab181	
Ab146	
Ab167	
Ab88	
Ab199	
Ab71	
Ab85	
Ab59	
Ab141	
Ab68	
Ab143	0.0047
Ab46	0.0056
Ab197	
Ab175	0.0898
Ab156	
Ab63	

clone	YTS_hTIGIT/hTIGIT_EFC, YTS_hTIGIT/hTIGIT, 11pt
Ab11	
Ab182	
Ab89	
Ab8	
Ab101	
Ab25	
Ab154	
Ab21	
Ab111	
Ab118	
Ab173	
Ab38	
Ab76	
Ab131	0.0172
Ab1	
Ab67	
Ab70	
Ab170	
Ab30	
Ab93	
Ab142	
Ab104	
Ab112	
Ab35	
Ab126	0.0375
Ab125	

EXAMPLE 5

METHOD OF IDENTIFICATION OF TIGIT ANTIBODIES FROM PHAGE DISPLAY SCREENING

[0185] In order to generate the above antibodies, phage displayed human antibody libraries were composed of diversified monovalent Fabs displayed as pIII fusions on the surface of M13 bacteriophage. Monovalent Fabs comprise human heavy chain frameworks, including the CH1 region, diversified in CDRs 1, 2, and 3 and complexed with a defined set of human antibody light chains.

[0186] Phagemid expression of monovalent Fab libraries was accomplished by standard methods. TG-1 cells transformed with expression plasmids were grown to mid log (O.D. 600 .about.0.3) in 2-YT media supplemented with 100 mcg/ml ampicillin and 2% glucose repression and then infected with m13K07 helper phage and grown overnight in 2-YT media supplemented with 100 mcg ampicillin, 70 mcg/ml kanamycin, and 200 micromolar IPTG. Phage containing supernatants were precipitated using polyethylene glycol and PBS resuspended phage were used to pan on immobilized TIGIT.

[0187] Panning of the libraries was performed by using recombinant soluble extracellular domains of TIGIT (Sino Biologicssor R&D Systems) immobilized on the wells of a microtiter dish or biotinylated TIGIT immobilized on streptavidin derivatized magnetic beads (Dynal - Life Technologies).

[0188] In the plate-based format, Immulon 4HBX ELISA plates were coated with TIGIT. The TIGIT sequences used can be found in Figure 4. Plates were then blocked in PBS, 0.05% Tween 20, 4% non-fat dried milk for 1 hour. Approximately 10^{12}-10^{13} phage were blocked as above and applied to the target coated wells. Following a two hour incubation, the wells were washed using PBS, 0.05% Tween 20. Phage were then eluted 0.2M Glycine-HCl, pH 2.2, 1 mg/ml BSA. Eluted phage were neutralized using 2M Tris base. The eluted phage were subjected to additional rounds of amplification and panning until the titer of the phage eluted from the TIGIT coated wells exceeded the titer eluted from uncoated, blocked wells.

[0189] In bead based panning, TIGIT was biotinylated using a NHS-PEO_4-biotinylation kit (Pierce). The biotinlyated protein was then immobilized on magnetic streptavidin beads (Dynal - Life Technologies). Panning was carried out essentially as described above for plate based panning except that PBS, 0.05% Tween 20, 1% BSA was used as the blocking agent. Beads were collected magnetically following the initial phage binding and after each wash step.

[0190] To identify phage clones that encoded TIGIT-binding monovalent Fabs, a portion of the eluted phage were used to infect E. coli HB2151 allowing expression of periplasmic phage-encoded monovalent Fabs. Individual clones were picked into deep-well plates and grown overnight in 2YT containing ampicillin and 0.2 mM IPTG. Bacteria were lysed in BPERII and the lysates were applied to TIGIT coated plates. Following washing, binding of antibodies was detected using an HRP-conjugated anti-human kappa and lambda light chain antibody (Bethyl). Daughter plates were also inoculated and grown in 2YT-Amp-glucose for Sanger-based sequencing to determine the antibody heavy and light chain sequences.

EXAMPLE 6

[0191] Presented in Table 6.1 are the results noted above, as well as the results for IgGs made using the corresponding CDRs sequences for the noted constructs from Example 5. Table 6.1 also provides data showing antagonism of the receptor in an assay that uses the same Grb2/TIGIT beta gal set up as provided in the above example 3, but the value provided is an EC50 value of Grb2 binding increase by the antibody in an assay replacing the 221_PVR cells with wild-type 221 cells (cells that don't express PVR). The point changes noted in the fourth column represent variants. Where no point change is present, then the IgG contained the same sequence as noted in the sequence for the designated antibody number.

[0192] Table 6.1

Ab	Name of IgG	IgG used	Point changes within CDRs	ELISA - Human TIGIT, 10pt	ELISA - Mouse TIGIT, 10pt	Comp. ELISA-Human TIGIT, 10pt	Comp. ELISA-Mouse TIGIT, 10pt	YTS_hTIGI/hGrbs_EFC_Agonism, YTS_hTIGIT/hGrb2, 221_WT, 11pt	YTS_hTIGI/hGrbs_EFC_Antagonism, YTS_hTIGIT/hGrb2, 221_hPVR/ICAM, 11pt	YTS_hTIGIT/hTIGIT_EFC, YTS_hTIGIT/hTIGIT, 221_hPVR/ICAM, 11pt	YTS_hTIGIT/hTIGIT_EFC, YTS_hTIGIT/hTIGIT, 221_hPVR/ICAM, 11pt
Ab 1				0.0403	0.1807	0.0899	0.6317				
	Ab1i 1	hIgG 1						0.0091	>1μM	0.0007	
	Ab1i 2	mIgG 2a									
	Ab1i 3	hIgG 1s						>1μM	0.1725	0.0024	
	Ab1i 4	hIgG 1s	I100aM								
	Ab1i 5	mIgG 2a	I100aA	0.0008	0.0068	0.0028	0.0133				
	Ab1i 6	mIgG 2a	P96A	0.0294	>1μM	0.0469	>1μM				
	Ab1i 7	mIgG 2a	S98A	0.0038	0.0729	0.0161	0.1832				
	Ab1i 8	mIgG 2a	S98G	0.0017	0.0263	0.0058	0.0993				
	Ab1i 9	mIgG 2a	V95A	0.0006	0.0023	0.0023	0.009				
	Ab1i 10	mIgG 2a	V99A	0.0039	0.0151	0.0058	0.4876				
	Ab1i 11	mIgG 2a	W100A	>1μM	>1μM	>1μM	>1μM				
	Ab1i 12	mIgG 2a	Y97A	>1μM	>1μM	>1μM	>1μM				
Ab 2				0.0157	>1μM	0.038	>1μM				
	Ab2i 1	hIgG 1s									
Ab 3				0.0586	>1μM	0.0235	>1μM	0.0441	0.1131		0.058
	Ab3i 1	hIgG 1		0.002	>1μM	0.0013	>1μM	4999	0.3842	0.0026	
Ab 4				0.0012	>1μM	0.0059	>1μM	>1μM	0.0922	inconclusive	0.0784
	Ab4i 1	hIgG 1		0.0003	>1μM	0.0014	>1μM	inconclusive	0.0131	0.0038	>1μM
Ab 5				0.0101	0.322	0.0357	0.3774				
Ab 6				0.0254	>1μM	0.0639	0.5111				
Ab 7				0.0146	0.0115	0.0598	0.0568				
Ab 8				0.106	0.1493	0.3472	0.4284				

Ab 9				0.0326	0.1814	0.0911	1.005				
Ab 10				0.1011	0.0407	0.071	0.0688	>1μM	>1μM	0.0572	
	Ab10i1	mIgG2a		0.0003	0.0001	0.0056	0.0012	>1μM	inconclusive	inconclusive	
	Ab10i2	hIgG1		0.0003	0.0001	0.0085	0.0011	inconclusive	0.3896	0.0026	
Ab 11				0.0902	0.3594	0.1969	0.3391				
Ab 12				0.0277	>1μM	0.0934	>1μM				
Ab 13				0.0431	0.0592	0.1233	0.1482				
Ab 14				0.0201	0.1694	0.059	0.8418				
Ab 15				0.005	0.0084	0.022	0.04	>1μM	>1μM	>1μM	
	Ab15i1	hIgG1		0.0048	0.0023	0.0022	0.0012	>1μM	>1μM	0.003	
	Ab15i2	mIgG2a		0.0216	0.0027	0.0109	0.0016	>1μM	0.2749	0.0117	
Ab 16				0.0036	0.0049	0.0159	0.0258	inconclusive	1.744	inconclusive	
	Ab16i1	hIgG1		0.0021	0.0005	0.0021	0.0004	inconclusive	inconclusive	0.0036	
	Ab16i2	mIgG2a		0.0064	0.0005	0.0846	0.0041	inconclusive	inconclusive	0.008	>1μM
Ab 17				0.0147	0.014	0.0529	0.0458	>1μM	>1μM	inconclusive	
	Ab17i1	hIgG1		0.0005	0.0001	0.0106	0.0011	0.0012	>1μM	0.0022	
	Ab17i2	mIgG2a		0.0017	0.0002	0.0458	0.0016	inconclusive	>1μM	0.0064	
Ab 18				0.0453	0.049	0.1906	0.1878				
Ab 19				0.0198	0.0648	0.0735	0.1839				
Ab 20				0.033	0.0327	0.1557	0.1801				
Ab 21				0.202	0.1467	0.1282	0.3154				
	Ab21i1	hIgG1		>1μM	>1μM	0.0485	0.2616	>1μM	>1μM	>1μM	
	Ab21i2	mIgG2a		0.0101	0.0101	0.0159	0.148	inconclusive	inconclusive	0.2593	
Ab 22				0.0091	0.0051	0.018	0.0242	0.0155	0.6079	0.0403	0.1466
	Ab22i1	hIgG1		0.0007	0.0003	0.0015	0.0005	inconclusive	0.1599	0.0025	
	Ab22i2	mIgG2a		0.0018	0.0002	0.0383	0.0026	>1μM	>1μM	>1μM	
Ab 23				0.289	0.0744	0.0931	0.1432				
Ab 24				0.0359	0.2545	0.1175	1.024				
Ab 25				0.0135	0.0209	0.047	0.0602				

Ab26				0.0533	0.0475	0.2748	0.2356				
Ab27				0.0127	0.0177	0.047	0.0518				
Ab28				0.0075	0.0287	0.0248	0.1435	inconclusive	0.2034	inconclusive	
	Ab28i1	hIgG1		0.0004	0.0027	0.0012	0.0013	inconclusive	0.0758	0.0009	
	Ab28i2	mIgG2a		0.0006	0.0025	0.002	0.0015	inconclusive	0.2601	0.0046	
Ab29				0.0097	0.041	0.0493	0.2798	>1μM	>1μM	>1μM	
	Ab29i1	hIgG1		0.0021	0.0135	0.0021	0.0035	inconclusive	0.3299	0.0028	
	Ab29i2	mIgG2a		0.0035	0.0139	0.0034	0.0084	inconclusive	>1μM	0.3133	>1μM
Ab30				0.0157	0.1353	0.084	0.3441				
Ab31				0.0125	0.0569	0.0502	0.2728				
Ab32				0.0043	0.0147	0.0134	0.0507	inconclusive	1.407	>1μM	
	Ab32i1	hIgG1		0.0004	0.0025	0.0011	0.0014	inconclusive	0.069	0.0024	
	Ab32i2	mIgG2a		0.0005	0.0021	0.002	0.0015	inconclusive	0.2425	0.003	
Ab33				0.025	0.0854	0.0826	0.5685				
Ab34				0.0087	0.105	0.0552	0.5826				
	Ab34i1	hIgG1		0.056	>1μM	0.0038	0.0275	>1μM	0.4964	0.0136	
	Ab34i2	mIgG2a		0.0242	>1μM	0.013	0.0859	>1μM	>1μM	0.0276	
Ab35				0.0312	0.3566	0.1199	0.4375				
Ab36				0.0628	0.47	0.1261	0.8038				
Ab37				0.0408	0.2208	0.1471	0.2166				
Ab38				0.0455	>1μM	0.08	>1μM				
Ab39				0.0327	0.0803	0.1213	0.1891				
Ab40				0.0003	>1μM	0.0038	>1μM	>1μM	0.0023	0.0095	
	Ab40i1	hIgG1		0.0003	>1μM	0.0013	>1μM	>1μM	0.0002	0.0018	
	Ab40i2	hIgG1	G33S	0.0002	>1μM	0.002	>1μM	0.0011	0.1858	0.0037	
	Ab40i3	mIgG2a	G33S	0.0002	0.041	0.0037	>1μM	0.08	0.0098	0.0016	
	Ab40i4	hIgG1	G33S_Y52aS	0.0003	0.0025	0.003	0.0111	0.0007	1.629	0.0032	
	Ab40i5	mIgG2a	G33S_Y52aS	0.0002	0.0024	0.0042	0.0169	0.0358	0.2382	0.0031	

	Ab40i6	hIgG1	Y52aS	0.0003	0.037	0.0027	0.0788	0.0014	0.2762	0.0032	
	Ab40i7	mIgG2a	Y52aS	0.0002	0.0076	0.003	0.1207	0.0156	0.0163	0.0027	
Ab41				0.011	0.0095	0.0764	0.0447	>1μM	>1μM		
	Ab41i1	hIgG1		0.0004	0.0002	0.0013	0.001	>1μM	>1μM	0.0018	
	Ab41i2	mIgG2a		0.0051	0.0003	0.0026	0.0019	>1μM	>1μM	0.0081	
Ab42				0.0765	0.0605	0.1988	0.1124				
Ab43				0.0479	0.0172	0.1965	0.0608				
Ab44				0.0135	0.1281	0.0416	0.2812				
Ab45				0.0354	0.048	0.1	0.1219				
Ab46				0.0082	0.095	0.1883	0.1185	5000	0.1593	0.0056	
	Ab46i1	hIgG1		0.0002	0.005	0.0011	0.0211	inconclusive	0.0773	0.0005	
	Ab46i2	mIgG2a		0.0006	0.0058	0.0019	0.3671	inconclusive	0.8703	0.0013	
Ab47				0.0349	0.3614	0.4918	0.3799				
Ab48				0.0138	0.0418	0.1106	0.0647	inconclusive	inconclusive	0.4772	
	Ab48i1	hIgG1		0.0002	0.0002	0.0019	0.0015	2499	0.0286	0.0013	
	Ab48i2	mIgG2a		0.0002	0.0002	0.0016	0.0019	1999	0.0068	0.0012	
Ab49				0.0276	0.058	0.158	0.2649				
Ab50				0.0447	0.0178	0.0397	0.0466	>1μM	>1μM	>1μM	
	Ab50i1	mIgG2a		0.0028	0.0003	0.0653	0.0021	>1μM	inconclusive	0.0063	
	Ab50i2	hIgG1		0.0003	0.0002	0.0066	0.0015	0.0032	inconclusive	0.0017	
Ab51				0.0972	0.0798	0.0754	0.3106	>1μM	inconclusive	0.0408	
Ab52											
	Ab52i1	hIgG1		0.0002	0.0004	0.0025	0.0041	0.0011	0.1899	0.0045	
Ab53				0.0043	0.0076	0.009	0.0353	inconclusive	0.0303	0.0027	
	Ab53i1	mIgG2a		0.0003	0.0004	0.0016	0.0042	1999	0.0259	0.0016	0.0012
	Ab53i2	hIgG1		0.0001	0.0002	0.0006	0.0015	inconclusive	0.0675	0.0011	
	Ab53i3	hIgG1	S33G	0.0008	0.0063	0.0083	0.0185	0.0042	>1μM	0.0046	
	Ab53i4	mIgG2a	S33G	0.0011	0.0046	0.0067	0.0482	0.0185	0.4499	0.0035	
	Ab53i5	hIgG1	S33G_S52	0.0002	>1μM	0.0021	>1μM	0.0057	0.526	0.0023	

			aY								
	Ab53i6	mIgG2a	S33G_S52aY	0.0002	0.0323	0.0017	>1μM	0.0077	0.0363	0.0016	
	Ab53i7	hIgG1	S52aY	0.0032	>1μM	0.0363	0.061	0.0681	1.928	0.0061	
	Ab53i8	mIgG2a	S52aY	0.0017	0.034	0.0125	>1μM	0.02	>1μM	0.0029	
Ab54				0.0919	0.0215	0.1124	0.0729				
Ab55				1.023	0.2907	0.255	0.3675	>1μM	>1μM	0.2214	
Ab56					0.0196	0.0997	0.1266				
Ab57				0.1454	0.3054	0.0566	0.1306	>1μM	>1μM	0.1528	
Ab58				0.6869	0.1695	0.1382	0.2384				
Ab59				>1μM	>1μM	>1μM	>1μM				
Ab60				0.0798	inconclusive	0.0464	0.2728	>1μM	>1μM	0.404	
Ab61				0.1125	>1μM	0.3977	0.8403				
Ab62				>1μM	0.3612	0.2667	0.9408				
Ab63				0.0919	0.1785	0.2041	0.1838	>1μM	>1μM	>1μM	
Ab64				0.229	inconclusive	0.1249	0.3621	>1μM	>1μM	0.7377	
Ab65				>1μM	0.778	0.435	0.4874				
Ab66				0.2596	>1μM	0.279	0.3091				
Ab67				>1μM	>1μM	0.6037	2.581				
Ab68				0.639	>1μM	0.2926	0.5568				
Ab69				>1μM	>1μM	0.9167	>1μM				
Ab70				>1μM	>1μM	0.4496	1.891				
Ab71				>1μM	0.477	0.1221	0.5911				
Ab72				0.0817	0.2347	0.4462	0.2266	>1μM	>1μM	>1μM	
Ab73				>1μM	0.2659	0.0999	1.219				
Ab74				0.1768	0.0419	0.1058	0.0589	0.0008	>1μM	0.0019	
Ab75				>1μM	>1μM	0.2715	1.857				
Ab76				0.0681	0.0657	0.1274	0.0896	0.0504	>1μM	>1μM	
Ab					0.111	0.5447	0.4125	>1μM	>1μM	>1μM	

77					4						
Ab 78				0.119	>1µM	0.1277	1.836				
Ab 79				0.0278	0.0866	0.0543	0.0334	>1µM	>1µM	>1µM	
Ab 80				0.8983	0.478	0.2575	0.2643	>1µM	>1µM	>1µM	
Ab 81				0.0495	0.3073	0.062	0.3523				
Ab 82				inconclusive	0.0615	0.5809	0.1076	>1µM	>1µM	>1µM	
Ab 83				inconclusive	inconclusive	inconclusive	0.9737				
Ab 84				0.3919	0.2207	0.1373	0.257	>1µM	>1µM	>1µM	
Ab 85				>1µM	0.6825	0.141	0.1534				
Ab 86				0.2643	0.0838	0.1243	0.3617				
Ab 87				inconclusive	0.2304	inconclusive	0.3725	>1µM	>1µM	>1µM	
Ab 88				0.149	0.4074	0.6681	1.364				
Ab 89				inconclusive	inconclusive	inconclusive	0.9985				
Ab 90				inconclusive	0.2034	0.3526	0.2541	0.0153	>1µM	0.0074	
Ab 91				inconclusive	0.242	inconclusive	0.4574				
Ab 92											
Ab 93				0.1221	>1µM	0.4337	0.9349				
Ab 94				0.0893	0.058	0.1157	0.0847	0.004	>1µM	>1µM	
Ab 95				0.3572	0.1001	0.526	0.2019	>1µM	>1µM	>1µM	
Ab 96				0.2106	0.3444	0.1926	0.4967	>1µM	>1µM	0.3209	
Ab 97				0.2887	>1µM	0.232	1.107				
Ab 98				0.0366	0.0219	0.0447	0.0593				
Ab 99				0.1757	0.05	0.1653	0.0807	>1µM	>1µM	0.154	
Ab 100				inconclusive	0.2575	5000	inconclusive				
Ab 101				inconclusive	0.535	inconclusive	5000	>1µM	>1µM	>1µM	

Ab102				>1µM	>1µM	0.4836	0.7866				
Ab103				5000	inconclusive	inconclusive	1.114				
Ab104				>1µM	>1µM	2.364	1.555				
Ab105				>1µM	>1µM	0.573	1.916				
Ab106				0.2288	0.1248	0.2179	0.1886	>1µM	>1µM	>1µM	
Ab107				>1µM	inconclusive	5000	5000				
Ab108				0.8345	0.6831	0.6936	2.819				
Ab109				>1µM	>1µM	0.4441	1.305				
Ab110				0.065	0.0619	0.1659	0.1999	>1µM	>1µM	0.3595	
Ab111				inconclusive	0.1855	0.4407	0.7051				
Ab112				0.7522	0.2131	0.293	0.3211	>1µM	>1µM	>1µM	
Ab113				inconclusive	inconclusive	inconclusive	1.026				
Ab114				>1µM	>1µM	0.4728	>1µM				
Ab115				>1µM	>1µM	0.6072	>1µM				
Ab116				0.4443	>1µM	0.704	>1µM				
Ab117				0.0017	0.0107	0.0385	0.0234	>1µM	>1µM	>1µM	
Ab118				0.392	0.1096	0.6052	0.3567	>1µM	>1µM	>1µM	
Ab119				inconclusive	0.2786	inconclusive	0.3888	>1µM	>1µM	>1µM	
Ab120				>1µM	0.2542	0.457	0.3177				
Ab				>1µ	>1µ	0.41	2.066				

121				M	M						
Ab122				0.1347	>1µM	0.7483	>1µM				
Ab123				0.43	0.5777	0.2292	1.944				
Ab124				0.0343	0.0141	0.2217	0.0856	>1µM	>1µM	0.3928	
Ab125				0.1273	0.1505	0.1111	1.395				
Ab126				0.2034	0.0641	0.3398	0.1827	0.0258	>1µM	0.0375	
Ab127				>1µM	>1µM	0.8486	0.4914				
Ab128				inconclusive	0.2646	inconclusive	0.3249	>1µM	>1µM	>1µM	
Ab129				>1µM	>1µM	>1µM	0.1293				
Ab130				inconclusive	0.432	>1µM	5000	>1µM	>1µM	>1µM	
Ab131				0.0072	0.3313	0.1713	0.116	>1µM	0.065	0.0172	
Ab132				>1µM	0.3113	>1µM	0.771				
Ab133				>1µM	>1µM	1.254	>1µM				
Ab134				>1µM	0.343	>1µM	0.8851				
Ab135				0.0254	0.0252	0.1447	0.0865	>1µM	>1µM	>1µM	
Ab136				0.1768	>1µM	>1µM	0.9557				
Ab137				inconclusive	0.0849	inconclusive	0.2111				
Ab138				0.234	0.0586	0.1772	0.252				
Ab139				0.1302	0.1246	0.249	2.148				
Ab14				inconclusiv	0.1734	0.6338	0.4787				

0				e							
Ab 141				0.1766	0.1233	0.215	0.2806				
Ab 142				0.1085	>1µM	0.6591	2.169				
Ab 143				0.0034	0.0057	0.0203	0.022	>1µM	0.0602	0.0047	
Ab 144				>1µM	0.315	>1µM	1.09				
Ab 145				0.2325	0.0504	0.4258	0.3346				
Ab 146				0.0076	0.0078	0.0453	0.0361	>1µM	>1µM	>1µM	
Ab 147				>1µM	>1µM	>1µM	>1µM				
Ab 148				0.1681	0.0164	0.1738	0.1201				
Ab 149				>1µM	0.052	>1µM	0.0471				
Ab 150				>1µM	0.0007	>1µM	0.0046				
Ab 151				0.3766	0.1758	0.4453	0.6308				
Ab 152				0.0271	>1µM	0.1067	1.095				
Ab 153				0.0877	0.0139	0.1494	0.0691				
Ab 154				0.0908	0.1218	0.3326	0.2508				
Ab 155				0.0328	0.234	0.203	0.5006				
Ab 156				>1µM	0.1645	>1µM	0.0653				
Ab 157				0.1654	0.1161	0.4347	0.5118				
Ab 158				>1µM	0.1565	>1µM	0.1315				
Ab 159				0.3846	0.1161	0.5386	0.2718				

Ab160				0.4041	0.0264	0.4074	0.2125				
Ab161				0.1222	0.4079	0.372	0.8733				
Ab162				0.0018	0.0204	0.0433	0.0283	>1μM	0.3645	>1μM	
Ab163				0.0492	0.3167	0.2119	0.1305				
Ab164				0.0154	0.2894	0.0753	0.1047				
Ab165				0.0128	0.2285	0.0891	0.1888				
Ab166				0.0041	0.0104	0.0226	0.028	>1μM	0.0212	0.0147	
Ab167				0.0126	0.0612	0.0885	0.0682				
Ab168				0.4759	0.2526	0.8658	0.2572				
Ab169				0.1527	0.1099	0.4434	0.1726				
Ab170				0.1379	>1μM	0.4011	0.4345				
Ab171				0.0346	0.0864	0.1697	0.1323				
Ab172				0.0832	0.1078	0.3863	0.1174				
Ab173				0.0457	0.0649	0.1468	0.1674				
Ab174				0.0145	0.1727	0.1075	0.085				
Ab175				0.0052	0.0393	0.042	0.0533	>1μM	0.2877	0.0898	
Ab176				0.0206	0.1871	0.1252	0.1697				
Ab177				0.0283	0.4387	0.1303	0.2831				
Ab178				0.0061	0.024	0.04	0.0591	>1μM	0.3616	0.0487	
Ab				0.155	0.228	0.3039	0.3944				

179										
Ab180				0.0223	0.0784	0.1276	0.1949				
Ab181										
Ab182				0.1813	0.1997	0.5126	0.5807				
Ab183				0.0057	0.1102	0.0751	0.1144				
Ab184				0.0143	0.0575	0.1058	0.1206				
Ab185				0.0817	0.1013	0.3398	0.1977				
Ab186				0.0207	0.429	0.1016	0.885				
Ab187				0.0062	>1μM	0.0817	0.1319				
Ab188				0.0093	0.0403	0.0456	0.1				
Ab189				0.0364	0.0529	0.1396	0.1408				
Ab190				0.0021	0.0234	0.037	0.0432				
Ab191				0.0449	0.1044	0.2782	0.2256				
Ab192				0.0124	0.2952	0.1592	0.5436				
Ab193				0.0046	>1μM	0.093	>1μM				
Ab194				0.0259	0.0706	0.155	0.2223				
Ab195				0.0441	0.1059	0.2459	0.301				
Ab196				0.0037	0.0195	0.0493	0.0452				
Ab197				0.0111	0.0814	0.1104	0.1045				
Ab19				0.0214	0.0691	0.1292	0.2535				

8											
Ab 19 9				0.0018	0.081	0.0464	0.1109				

[0193] In some embodiments, any one or more of the alternative CDRs provided as designated in column 4 of table 6.1 can be used for any of the antigen binding molecules or methods related thereto as provided herein. In some embodiments, any one or more of the IgG constructs provided in Table 6.1 can be employed as a construct, therapeutic, within a conjugate and/or in a method of treatment.

[0194] In some embodiments, an isolated antigen binding molecule (such as a full length antibody or antigen binding fragment thereof) can comprise any one or more of a CDR within any of SEQ ID NO. 1 – SEQ ID NO: 97, SEQ ID NO: 195 – SEQ ID NO: 209, SEQ ID NO: 225 – SEQ ID NO: 310, SEQ ID NO: 98 – SEQ ID NO: 194, SEQ ID NO: 210 – SEQ ID NO: 224, or SEQ ID NO: 311 – SEQ ID NO: 396 as shown in figures 2A, 2B, 2C, 3A, 3B, or 3C. In some embodiments, an isolated antigen binding molecule that competes for binding to human TIGIT with an antibody comprises all 6 CDRs from a single clone in any one of SEQ ID NO. 1 – SEQ ID NO: 97, SEQ ID NO: 195 – SEQ ID NO: 209, SEQ ID NO: 225 – SEQ ID NO: 310, SEQ ID NO: 98 – SEQ ID NO: 194, SEQ ID NO: 210 – SEQ ID NO: 224, or SEQ ID NO: 311 – SEQ ID NO: 396 as shown in figures 2A, 2B, 2C, 3A, 3B, or 3C. In some embodiments, an antigen binding molecule that competes with one of the above constructs can instead be employed.

[0195] In some embodiments, an isolated antigen binding molecule that competes for binding to human TIGIT with an antibody comprises a heavy variable region (SEQ ID NO. 1 – SEQ ID NO: 97, SEQ ID NO: 195 – SEQ ID NO: 209, SEQ ID NO: 225 – SEQ ID NO: 310) and a light chain variable region (SEQ ID NO: 98 – SEQ ID NO: 194, SEQ ID NO: 210 – SEQ ID NO: 224, or SEQ ID NO: 311 – SEQ ID NO: 396) from a single clone identified in any one of figures 2A, 2B, or 2C.

[0196] In some embodiments, an isolated antigen binding molecule that binds to human TIGIT comprises a heavy chain CDR1 comprising the amino acid sequence of any one of the HCDR1s in SEQ ID NO: 397, SEQ ID NO: 403. SEQ ID NO: 409, SEQ ID NO:

415, SEQ ID NO: 421, SEQ ID NO: 427, SEQ ID NO: 433, SEQ ID NO: 439, SEQ ID NO: 445, SEQ ID NO: 451, SEQ ID NO: 457, SEQ ID NO: 463, SEQ ID NO: 469, SEQ ID NO: 475, SEQ ID NO: 481, SEQ ID NO: 487, SEQ ID NO: 493, SEQ ID NO: 499, SEQ ID NO: 505, SEQ ID NO: 511, SEQ ID NO: 517, SEQ ID NO: 523, SEQ ID NO: 529, SEQ ID NO: 535, SEQ ID NO: 541, SEQ ID NO: 547, SEQ ID NO: 553, SEQ ID NO: 559, SEQ ID NO: 565, SEQ ID NO: 571, SEQ ID NO: 577, SEQ ID NO: 583, SEQ ID NO: 589, SEQ ID NO: 595, SEQ ID NO: 601, SEQ ID NO: 607, SEQ ID NO: 613, SEQ ID NO: 619, SEQ ID NO: 625, SEQ ID NO: 631, SEQ ID NO: 637, SEQ ID NO: 643, SEQ ID NO: 649, SEQ ID NO: 655, SEQ ID NO: 661, SEQ ID NO: 667, SEQ ID NO: 673, SEQ ID NO: 679, SEQ ID NO: 685, SEQ ID NO: 691, SEQ ID NO: 697, SEQ ID NO: 703, SEQ ID NO: 709, SEQ ID NO: 715, SEQ ID NO: 721, SEQ ID NO: 727, SEQ ID NO: 733, SEQ ID NO: 739, SEQ ID NO: 745, SEQ ID NO: 751, SEQ ID NO: 757, SEQ ID NO: 763, SEQ ID NO: 769, SEQ ID NO: 775, SEQ ID NO: 781, SEQ ID NO: 787, SEQ ID NO: 793, SEQ ID NO: 799, SEQ ID NO: 805, SEQ ID NO: 811, SEQ ID NO: 817, SEQ ID NO: 823, SEQ ID NO: 829, SEQ ID NO: 835, SEQ ID NO: 841, SEQ ID NO: 847, SEQ ID NO: 853, SEQ ID NO: 859, SEQ ID NO: 865, SEQ ID NO: 871, SEQ ID NO: 877, SEQ ID NO: 883, SEQ ID NO: 889, SEQ ID NO: 895, SEQ ID NO: 901, SEQ ID NO: 907, SEQ ID NO: 913, SEQ ID NO: 919, SEQ ID NO: 925, SEQ ID NO: 931, SEQ ID NO: 937, SEQ ID NO: 943, SEQ ID NO: 949, SEQ ID NO: 955, SEQ ID NO: 961, SEQ ID NO: 967, SEQ ID NO: 973, SEQ ID NO: 979, SEQ ID NO: 985, SEQ ID NO: 991, SEQ ID NO: 997, SEQ ID NO: 1003, SEQ ID NO: 1009, SEQ ID NO: 1015, SEQ ID NO: 1021, SEQ ID NO: 1027, SEQ ID NO: 1033, SEQ ID NO: 1039, SEQ ID NO: 1045, SEQ ID NO: 1051, SEQ ID NO: 1057, SEQ ID NO: 1063, SEQ ID NO: 1069, SEQ ID NO: 1075, SEQ ID NO: 1081, SEQ ID NO: 1087, SEQ ID NO: 1093, SEQ ID NO: 1099, SEQ ID NO: 1105, SEQ ID NO: 1111, SEQ ID NO: 1117, SEQ ID NO: 1123, SEQ ID NO: 1129, SEQ ID NO: 1135, SEQ ID NO: 1141, SEQ ID NO: 1147, SEQ ID NO: 1153, SEQ ID NO: 1159, SEQ ID NO: 1165, SEQ ID NO: 1171, SEQ ID NO: 1177, SEQ ID NO: 1183, SEQ ID NO: 1189, SEQ ID NO: 1195, SEQ ID NO: 1201, SEQ ID NO: 1207, SEQ ID NO: 1213, SEQ ID NO: 1219, SEQ ID NO: 1225, SEQ ID NO: 1231, SEQ ID NO: 1237, SEQ ID NO: 1243, SEQ ID NO: 1249, SEQ ID NO: 1255, SEQ ID NO: 1261, SEQ ID NO: 1267, SEQ ID NO: 1273, SEQ ID NO: 1279, SEQ ID NO: 1285, SEQ ID NO: 1291,

SEQ ID NO: 1297, SEQ ID NO: 1303, SEQ ID NO: 1309, SEQ ID NO: 1315, SEQ ID NO: 1321, SEQ ID NO: 1327, SEQ ID NO: 1333, SEQ ID NO: 1339, SEQ ID NO: 1345, SEQ ID NO: 1351, SEQ ID NO: 1357, SEQ ID NO: 1363, SEQ ID NO: 1369, SEQ ID NO: 1375, SEQ ID NO: 1381, SEQ ID NO: 1387, SEQ ID NO: 1393, SEQ ID NO: 1399, SEQ ID NO: 1405, SEQ ID NO: 1411, SEQ ID NO: 1417, SEQ ID NO: 1423, SEQ ID NO: 1429, SEQ ID NO: 1435, SEQ ID NO: 1441, SEQ ID NO: 1447, SEQ ID NO: 1453, SEQ ID NO: 1459, SEQ ID NO: 1465, SEQ ID NO: 1471, SEQ ID NO: 1477, SEQ ID NO: 1483, SEQ ID NO: 1489, SEQ ID NO: 1495, SEQ ID NO: 1501, SEQ ID NO: 1507, SEQ ID NO: 1513, SEQ ID NO: 1519, SEQ ID NO: 1593, SEQ ID NO: 1525 SEQ ID NO: 1531, SEQ ID NO: 1537, SEQ ID NO: 1543, SEQ ID NO: 1549, SEQ ID NO: 1555, SEQ ID NO: 1561, SEQ ID NO: 1567, SEQ ID NO: 1573, SEQ ID NO: 1579, or SEQ ID NO: 1585 as shown in Figure 3A, 3B, or 3C, a heavy chain CDR2 comprising the amino acid sequence of any one of the HCDR2s in SEQ ID NO: 398, SEQ ID NO: 404, SEQ ID NO: 410, SEQ ID NO: 416, SEQ ID NO: 422, SEQ ID NO: 428, SEQ ID NO: 434, SEQ ID NO: 440, SEQ ID NO: 446, SEQ ID NO: 452, SEQ ID NO: 458, SEQ ID NO: 464, SEQ ID NO: 470, SEQ ID NO: 476, SEQ ID NO: 482, SEQ ID NO: 488, SEQ ID NO: 494, SEQ ID NO: 500, SEQ ID NO: 506, SEQ ID NO: 512, SEQ ID NO: 518, SEQ ID NO: 524, SEQ ID NO: 530, SEQ ID NO: 536, SEQ ID NO: 542, SEQ ID NO: 548, SEQ ID NO: 554, SEQ ID NO: 560, SEQ ID NO: 566, SEQ ID NO: 572, SEQ ID NO: 578, SEQ ID NO: 584, SEQ ID NO: 590, SEQ ID NO: 596, SEQ ID NO: 602, SEQ ID NO: 608, SEQ ID NO: 614, SEQ ID NO: 620, SEQ ID NO: 626, SEQ ID NO: 632, SEQ ID NO: 638, SEQ ID NO: 644, SEQ ID NO: 650, SEQ ID NO: 656, SEQ ID NO: 662, SEQ ID NO: 668, SEQ ID NO: 674, SEQ ID NO: 680, SEQ ID NO: 686, SEQ ID NO: 692, SEQ ID NO: 698, SEQ ID NO: 704, SEQ ID NO: 710, SEQ ID NO: 716, SEQ ID NO: 722, SEQ ID NO: 728, SEQ ID NO: 734, SEQ ID NO: 740, SEQ ID NO: 746, SEQ ID NO: 752, SEQ ID NO: 758, SEQ ID NO: 764, SEQ ID NO: 770, SEQ ID NO: 776, SEQ ID NO: 782, SEQ ID NO: 788, SEQ ID NO: 794, SEQ ID NO: 800, SEQ ID NO: 806, SEQ ID NO: 812, SEQ ID NO: 818, SEQ ID NO: 824, SEQ ID NO: 830, SEQ ID NO: 836, SEQ ID NO: 842, SEQ ID NO: 848, SEQ ID NO: 854, SEQ ID NO: 860, SEQ ID NO: 866, SEQ ID NO: 872, SEQ ID NO: 878, SEQ ID NO: 884, SEQ ID NO: 890, SEQ ID NO: 896, SEQ ID NO: 902, SEQ ID NO: 908, SEQ ID NO: 914, SEQ ID NO: 920, SEQ ID NO: 926, SEQ

ID NO: 932, SEQ ID NO: 938, SEQ ID NO: 944, SEQ ID NO: 950, SEQ ID NO: 956, SEQ ID NO: 962, SEQ ID NO: 968, SEQ ID NO: 974, SEQ ID NO: 980, SEQ ID NO: 986, SEQ ID NO: 992, SEQ ID NO: 998, SEQ ID NO: 1004, SEQ ID NO: 1010, SEQ ID NO: 1016, SEQ ID NO: 1022, SEQ ID NO: 1028, SEQ ID NO: 1034, SEQ ID NO: 1040, SEQ ID NO: 1046, SEQ ID NO: 1052, SEQ ID NO: 1058, SEQ ID NO: 1064, SEQ ID NO: 1070, SEQ ID NO: 1076, SEQ ID NO: 1082, SEQ ID NO: 1088, SEQ ID NO: 1094, SEQ ID NO: 1100, SEQ ID NO: 1106, SEQ ID NO: 1112, SEQ ID NO: 1118, SEQ ID NO: 1124, SEQ ID NO: 1130, SEQ ID NO: 1136, SEQ ID NO: 1142, SEQ ID NO: 1148, SEQ ID NO: 1154, SEQ ID NO: 1160, SEQ ID NO: 1166, SEQ ID NO: 1172, SEQ ID NO: 1178, SEQ ID NO: 1184, SEQ ID NO: 1190, SEQ ID NO: 1196, SEQ ID NO: 1202, SEQ ID NO: 1208, SEQ ID NO: 1214, SEQ ID NO: 1220, SEQ ID NO: 1226, SEQ ID NO: 1232, SEQ ID NO: 1238, SEQ ID NO: 1244, SEQ ID NO: 1250, SEQ ID NO: 1256, SEQ ID NO: 1262, SEQ ID NO: 1268, SEQ ID NO: 1274, SEQ ID NO: 1280, SEQ ID NO: 1286, SEQ ID NO: 1292, SEQ ID NO: 1298, SEQ ID NO: 1304, SEQ ID NO: 1310, SEQ ID NO: 1316, SEQ ID NO: 1322, SEQ ID NO: 1328, SEQ ID NO: 1334, SEQ ID NO: 1340, SEQ ID NO: 1346, SEQ ID NO: 1352, SEQ ID NO: 1358, SEQ ID NO: 1364, SEQ ID NO: 1370, SEQ ID NO: 1376, SEQ ID NO: 1382, SEQ ID NO: 1388, SEQ ID NO: 1394, SEQ ID NO: 1400, SEQ ID NO: 1406, SEQ ID NO: 1412, SEQ ID NO: 1418, SEQ ID NO: 1424, SEQ ID NO: 1430, SEQ ID NO: 1436, SEQ ID NO: 1442, SEQ ID NO: 1448, SEQ ID NO: 1454, SEQ ID NO: 1460, SEQ ID NO: 1466, SEQ ID NO: 1472, SEQ ID NO: 1478, SEQ ID NO: 1484, SEQ ID NO: 1490, SEQ ID NO: 1496, SEQ ID NO: 1502, SEQ ID NO: 1508, SEQ ID NO: 1514, SEQ ID NO: 1520, SEQ ID NO: 1594, SEQ ID NO: 1526, SEQ ID NO: 1532, SEQ ID NO: 1538, SEQ ID NO: 1544, SEQ ID NO: 1550, SEQ ID NO: 1556, SEQ ID NO: 1562, SEQ ID NO: 1568, SEQ ID NO: 1574, SEQ ID NO: 1580, or SEQ ID NO: 1586 as shown in in Figure 3A, 3B, or 3C, and a heavy chain CDR3 comprising the amino acid sequence of any one of the HCDR3s in SEQ ID NO: 399, SEQ ID NO: 405, SEQ ID NO: 411, SEQ ID NO: 417, SEQ ID NO: 423, SEQ ID NO: 429, SEQ ID NO: 435, SEQ ID NO: 441, SEQ ID NO: 447, SEQ ID NO: 453, SEQ ID NO: 459, SEQ ID NO: 465, SEQ ID NO: 471, SEQ ID NO: 477, SEQ ID NO: 483, SEQ ID NO: 489, SEQ ID NO: 495, SEQ ID NO: 501, SEQ ID NO: 507, SEQ ID NO: 513, SEQ ID NO: 519, SEQ ID NO: 525, SEQ ID NO: 531, SEQ ID NO: 537, SEQ ID NO: 543, SEQ

ID NO: 549, SEQ ID NO: 555, SEQ ID NO: 561, SEQ ID NO: 567, SEQ ID NO: 573, SEQ ID NO: 579, SEQ ID NO: 585, SEQ ID NO: 591, SEQ ID NO: 597, SEQ ID NO: 603, SEQ ID NO: 609, SEQ ID NO: 615, SEQ ID NO: 621, SEQ ID NO: 627, SEQ ID NO: 633, SEQ ID NO: 639, SEQ ID NO: 645, SEQ ID NO: 651, SEQ ID NO: 657, SEQ ID NO: 663, SEQ ID NO: 669, SEQ ID NO: 675, SEQ ID NO: 681, SEQ ID NO: 687, SEQ ID NO: 693, SEQ ID NO: 699, SEQ ID NO: 705, SEQ ID NO: 711, SEQ ID NO: 717, SEQ ID NO: 723, SEQ ID NO: 729, SEQ ID NO: 735, SEQ ID NO: 741, SEQ ID NO: 747, SEQ ID NO: 753, SEQ ID NO: 759, SEQ ID NO: 765, SEQ ID NO: 771, SEQ ID NO: 777, SEQ ID NO: 783, SEQ ID NO: 789, SEQ ID NO: 795, SEQ ID NO: 801, SEQ ID NO: 807, SEQ ID NO: 813, SEQ ID NO: 819, SEQ ID NO: 825, SEQ ID NO: 831, SEQ ID NO: 837, SEQ ID NO: 843, SEQ ID NO: 849, SEQ ID NO: 855, SEQ ID NO: 861, SEQ ID NO: 867, SEQ ID NO: 873, SEQ ID NO: 879, SEQ ID NO: 885, SEQ ID NO: 891, SEQ ID NO: 897, SEQ ID NO: 903, SEQ ID NO: 909, SEQ ID NO: 915, SEQ ID NO: 921, SEQ ID NO: 927, SEQ ID NO: 933, SEQ ID NO: 939, SEQ ID NO: 945, SEQ ID NO: 951, SEQ ID NO: 957, SEQ ID NO: 963, SEQ ID NO: 969, SEQ ID NO: 975, SEQ ID NO: 981, SEQ ID NO: 987, SEQ ID NO: 993, SEQ ID NO: 999, SEQ ID NO: 1005, SEQ ID NO: 1011, SEQ ID NO: 1017, SEQ ID NO: 1023, SEQ ID NO: 1029, SEQ ID NO: 1035, SEQ ID NO: 1041, SEQ ID NO: 1047, SEQ ID NO: 1053, SEQ ID NO: 1059, SEQ ID NO: 1065, SEQ ID NO: 1071, SEQ ID NO: 1077, SEQ ID NO: 1083, SEQ ID NO: 1089, SEQ ID NO: 1095, SEQ ID NO: 1101, SEQ ID NO: 1107, SEQ ID NO: 1113, SEQ ID NO: 1119, SEQ ID NO: 1125, SEQ ID NO: 1131, SEQ ID NO: 1137, SEQ ID NO: 1143, SEQ ID NO: 1149, SEQ ID NO: 1155, SEQ ID NO: 1161, SEQ ID NO: 1167, SEQ ID NO: 1173, SEQ ID NO: 1179, SEQ ID NO: 1185, SEQ ID NO: 1191, SEQ ID NO: 1197, SEQ ID NO: 1203, SEQ ID NO: 1209, SEQ ID NO: 1215, SEQ ID NO: 1221, SEQ ID NO: 1227, SEQ ID NO: 1233, SEQ ID NO: 1239, SEQ ID NO: 1245, SEQ ID NO: 1251, SEQ ID NO: 1257, SEQ ID NO: 1263, SEQ ID NO: 1269, SEQ ID NO: 1275, SEQ ID NO: 1281, SEQ ID NO: 1287, SEQ ID NO: 1293, SEQ ID NO: 1299, SEQ ID NO: 1305, SEQ ID NO: 1311, SEQ ID NO: 1317, SEQ ID NO: 1323, SEQ ID NO: 1329, SEQ ID NO: 1335, SEQ ID NO: 1341, SEQ ID NO: 1347, SEQ ID NO: 1353, SEQ ID NO: 1359, SEQ ID NO: 1365, SEQ ID NO: 1371, SEQ ID NO: 1377, SEQ ID NO: 1383, SEQ ID NO: 1389, SEQ ID NO: 1395, SEQ ID NO: 1401, SEQ ID NO: 1407, SEQ ID NO: 1413, SEQ ID

NO: 1419, SEQ ID NO: 1425, SEQ ID NO: 1431, SEQ ID NO: 1437, SEQ ID NO: 1443, SEQ ID NO: 1449, SEQ ID NO: 1455, SEQ ID NO: 1461, SEQ ID NO: 1467, SEQ ID NO: 1473, SEQ ID NO: 1479, SEQ ID NO: 1485, SEQ ID NO: 1491, SEQ ID NO: 1497, SEQ ID NO: 1503, SEQ ID NO: 1509, SEQ ID NO: 1515, SEQ ID NO: 1521, SEQ ID NO: 1595, SEQ ID NO: 1527, SEQ ID NO: 1533, SEQ ID NO: 1539, SEQ ID NO: 1545, SEQ ID NO: 1551, SEQ ID NO: 1557, SEQ ID NO: 1563, SEQ ID NO: 1569, SEQ ID NO: 1575, SEQ ID NO: 1581, or SEQ ID NO: 1587 as shown in in Figure 3A, 3B, or 3C.

[0197] In some embodiments, an isolated antigen binding molecule that binds to human TIGIT comprises a heavy chain CDR1 comprising the amino acid sequence of any one of the HCDR1s in SEQ ID NO: 397, SEQ ID NO: 403. SEQ ID NO: 409, SEQ ID NO: 415, SEQ ID NO: 421, SEQ ID NO: 427, SEQ ID NO: 433, SEQ ID NO: 439, SEQ ID NO: 445, SEQ ID NO: 451, SEQ ID NO: 457, SEQ ID NO: 463, SEQ ID NO: 469, SEQ ID NO: 475, SEQ ID NO: 481, SEQ ID NO: 487, SEQ ID NO: 493, SEQ ID NO: 499, SEQ ID NO: 505, SEQ ID NO: 511, SEQ ID NO: 517, SEQ ID NO: 523, SEQ ID NO: 529, SEQ ID NO: 535, SEQ ID NO: 541, SEQ ID NO: 547, SEQ ID NO: 553, SEQ ID NO: 559, SEQ ID NO: 565, SEQ ID NO: 571, SEQ ID NO: 577, SEQ ID NO: 583, SEQ ID NO: 589, SEQ ID NO: 595, SEQ ID NO: 601, SEQ ID NO: 607, SEQ ID NO: 613, SEQ ID NO: 619, SEQ ID NO: 625, SEQ ID NO: 631, SEQ ID NO: 637, SEQ ID NO: 643, SEQ ID NO: 649, SEQ ID NO: 655, SEQ ID NO: 661, SEQ ID NO: 667, SEQ ID NO: 673, SEQ ID NO: 679, SEQ ID NO: 685, SEQ ID NO: 691, SEQ ID NO: 697, SEQ ID NO: 703, SEQ ID NO: 709, SEQ ID NO: 715, SEQ ID NO: 721, SEQ ID NO: 727, SEQ ID NO: 733, SEQ ID NO: 739, SEQ ID NO: 745, SEQ ID NO: 751, SEQ ID NO: 757, SEQ ID NO: 763, SEQ ID NO: 769, SEQ ID NO: 775, SEQ ID NO: 781, SEQ ID NO: 787, SEQ ID NO: 793, SEQ ID NO: 799, SEQ ID NO: 805, SEQ ID NO: 811, SEQ ID NO: 817, SEQ ID NO: 823, SEQ ID NO: 829, SEQ ID NO: 835, SEQ ID NO: 841, SEQ ID NO: 847, SEQ ID NO: 853, SEQ ID NO: 859, SEQ ID NO: 865, SEQ ID NO: 871, SEQ ID NO: 877, SEQ ID NO: 883, SEQ ID NO: 889, SEQ ID NO: 895, SEQ ID NO: 901, SEQ ID NO: 907, SEQ ID NO: 913, SEQ ID NO: 919, SEQ ID NO: 925, SEQ ID NO: 931, SEQ ID NO: 937, SEQ ID NO: 943, SEQ ID NO: 949, SEQ ID NO: 955, SEQ ID NO: 961, SEQ ID NO: 967, SEQ ID NO: 973, SEQ ID NO: 979, SEQ ID NO: 985, SEQ ID NO: 991, SEQ ID NO: 997, SEQ ID NO: 1003, SEQ ID NO: 1009, SEQ ID

NO: 1015, SEQ ID NO: 1021, SEQ ID NO: 1027, SEQ ID NO: 1033, SEQ ID NO: 1039, SEQ ID NO: 1045, SEQ ID NO: 1051, SEQ ID NO: 1057, SEQ ID NO: 1063, SEQ ID NO: 1069, SEQ ID NO: 1075, SEQ ID NO: 1081, SEQ ID NO: 1087, SEQ ID NO: 1093, SEQ ID NO: 1099, SEQ ID NO: 1105, SEQ ID NO: 1111, SEQ ID NO: 1117, SEQ ID NO: 1123, SEQ ID NO: 1129, SEQ ID NO: 1135, SEQ ID NO: 1141, SEQ ID NO: 1147, SEQ ID NO: 1153, SEQ ID NO: 1159, SEQ ID NO: 1165, SEQ ID NO: 1171, SEQ ID NO: 1177, SEQ ID NO: 1183, SEQ ID NO: 1189, SEQ ID NO: 1195, SEQ ID NO: 1201, SEQ ID NO: 1207, SEQ ID NO: 1213, SEQ ID NO: 1219, SEQ ID NO: 1225, SEQ ID NO: 1231, SEQ ID NO: 1237, SEQ ID NO: 1243, SEQ ID NO: 1249, SEQ ID NO: 1255, SEQ ID NO: 1261, SEQ ID NO: 1267, SEQ ID NO: 1273, SEQ ID NO: 1279, SEQ ID NO: 1285, SEQ ID NO: 1291, SEQ ID NO: 1297, SEQ ID NO: 1303, SEQ ID NO: 1309, SEQ ID NO: 1315, SEQ ID NO: 1321, SEQ ID NO: 1327, SEQ ID NO: 1333, SEQ ID NO: 1339, SEQ ID NO: 1345, SEQ ID NO: 1351, SEQ ID NO: 1357, SEQ ID NO: 1363, SEQ ID NO: 1369, SEQ ID NO: 1375, SEQ ID NO: 1381, SEQ ID NO: 1387, SEQ ID NO: 1393, SEQ ID NO: 1399, SEQ ID NO: 1405, SEQ ID NO: 1411, SEQ ID NO: 1417, SEQ ID NO: 1423, SEQ ID NO: 1429, SEQ ID NO: 1435, SEQ ID NO: 1441, SEQ ID NO: 1447, SEQ ID NO: 1453, SEQ ID NO: 1459, SEQ ID NO: 1465, SEQ ID NO: 1471, SEQ ID NO: 1477, SEQ ID NO: 1483, SEQ ID NO: 1489, SEQ ID NO: 1495, SEQ ID NO: 1501, SEQ ID NO: 1507, SEQ ID NO: 1513, SEQ ID NO: 1519, SEQ ID NO: 1593, SEQ ID NO: 1525 SEQ ID NO: 1531, SEQ ID NO: 1537, SEQ ID NO: 1543, SEQ ID NO: 1549, SEQ ID NO: 1555, SEQ ID NO: 1561, SEQ ID NO: 1567, SEQ ID NO: 1573, SEQ ID NO: 1579, or SEQ ID NO: 1585 as shown in Figure 3A, 3B, or 3C, a heavy chain CDR2 comprising the amino acid sequence of any one of the HCDR2s in SEQ ID NO: 398, SEQ ID NO: 404, SEQ ID NO: 410, SEQ ID NO: 416, SEQ ID NO: 422, SEQ ID NO: 428, SEQ ID NO: 434, SEQ ID NO: 440, SEQ ID NO: 446, SEQ ID NO: 452, SEQ ID NO: 458, SEQ ID NO: 464, SEQ ID NO: 470, SEQ ID NO: 476, SEQ ID NO: 482, SEQ ID NO: 488, SEQ ID NO: 494, SEQ ID NO: 500, SEQ ID NO: 506, SEQ ID NO: 512, SEQ ID NO: 518, SEQ ID NO: 524, SEQ ID NO: 530, SEQ ID NO: 536, SEQ ID NO: 542, SEQ ID NO: 548, SEQ ID NO: 554, SEQ ID NO: 560, SEQ ID NO: 566, SEQ ID NO: 572, SEQ ID NO: 578, SEQ ID NO: 584, SEQ ID NO: 590, SEQ ID NO: 596, SEQ ID NO: 602, SEQ ID NO: 608, SEQ ID NO: 614, SEQ ID NO: 620, SEQ ID NO: 626, SEQ

ID NO: 632, SEQ ID NO: 638, SEQ ID NO: 644, SEQ ID NO: 650, SEQ ID NO: 656, SEQ ID NO: 662, SEQ ID NO: 668, SEQ ID NO: 674, SEQ ID NO: 680, SEQ ID NO: 686, SEQ ID NO: 692, SEQ ID NO: 698, SEQ ID NO: 704, SEQ ID NO: 710, SEQ ID NO: 716, SEQ ID NO: 722, SEQ ID NO: 728, SEQ ID NO: 734, SEQ ID NO: 740, SEQ ID NO: 746, SEQ ID NO: 752, SEQ ID NO: 758, SEQ ID NO: 764, SEQ ID NO: 770, SEQ ID NO: 776, SEQ ID NO: 782, SEQ ID NO: 788, SEQ ID NO: 794, SEQ ID NO: 800, SEQ ID NO: 806, SEQ ID NO: 812, SEQ ID NO: 818, SEQ ID NO: 824, SEQ ID NO: 830, SEQ ID NO: 836, SEQ ID NO: 842, SEQ ID NO: 848, SEQ ID NO: 854, SEQ ID NO: 860, SEQ ID NO: 866, SEQ ID NO: 872, SEQ ID NO: 878, SEQ ID NO: 884, SEQ ID NO: 890, SEQ ID NO: 896, SEQ ID NO: 902, SEQ ID NO: 908, SEQ ID NO: 914, SEQ ID NO: 920, SEQ ID NO: 926, SEQ ID NO: 932, SEQ ID NO: 938, SEQ ID NO: 944, SEQ ID NO: 950, SEQ ID NO: 956, SEQ ID NO: 962, SEQ ID NO: 968, SEQ ID NO: 974, SEQ ID NO: 980, SEQ ID NO: 986, SEQ ID NO: 992, SEQ ID NO: 998, SEQ ID NO: 1004, SEQ ID NO: 1010, SEQ ID NO: 1016, SEQ ID NO: 1022, SEQ ID NO: 1028, SEQ ID NO: 1034, SEQ ID NO: 1040, SEQ ID NO: 1046, SEQ ID NO: 1052, SEQ ID NO: 1058, SEQ ID NO: 1064, SEQ ID NO: 1070, SEQ ID NO: 1076, SEQ ID NO: 1082, SEQ ID NO: 1088, SEQ ID NO: 1094, SEQ ID NO: 1100, SEQ ID NO: 1106, SEQ ID NO: 1112, SEQ ID NO: 1118, SEQ ID NO: 1124, SEQ ID NO: 1130, SEQ ID NO: 1136, SEQ ID NO: 1142, SEQ ID NO: 1148, SEQ ID NO: 1154, SEQ ID NO: 1160, SEQ ID NO: 1166, SEQ ID NO: 1172, SEQ ID NO: 1178, SEQ ID NO: 1184, SEQ ID NO: 1190, SEQ ID NO: 1196, SEQ ID NO: 1202, SEQ ID NO: 1208, SEQ ID NO: 1214, SEQ ID NO: 1220, SEQ ID NO: 1226, SEQ ID NO: 1232, SEQ ID NO: 1238, SEQ ID NO: 1244, SEQ ID NO: 1250, SEQ ID NO: 1256, SEQ ID NO: 1262, SEQ ID NO: 1268, SEQ ID NO: 1274, SEQ ID NO: 1280, SEQ ID NO: 1286, SEQ ID NO: 1292, SEQ ID NO: 1298, SEQ ID NO: 1304, SEQ ID NO: 1310, SEQ ID NO: 1316, SEQ ID NO: 1322, SEQ ID NO: 1328, SEQ ID NO: 1334, SEQ ID NO: 1340, SEQ ID NO: 1346, SEQ ID NO: 1352, SEQ ID NO: 1358, SEQ ID NO: 1364, SEQ ID NO: 1370, SEQ ID NO: 1376, SEQ ID NO: 1382, SEQ ID NO: 1388, SEQ ID NO: 1394, SEQ ID NO: 1400, SEQ ID NO: 1406, SEQ ID NO: 1412, SEQ ID NO: 1418, SEQ ID NO: 1424, SEQ ID NO: 1430, SEQ ID NO: 1436, SEQ ID NO: 1442, SEQ ID NO: 1448, SEQ ID NO: 1454, SEQ ID NO: 1460, SEQ ID NO: 1466, SEQ ID NO: 1472, SEQ ID NO: 1478, SEQ ID NO: 1484, SEQ ID NO: 1490, SEQ ID

NO: 1496, SEQ ID NO: 1502, SEQ ID NO: 1508, SEQ ID NO: 1514, SEQ ID NO: 1520, SEQ ID NO: 1594, SEQ ID NO: 1526, SEQ ID NO: 1532, SEQ ID NO: 1538, SEQ ID NO: 1544, SEQ ID NO: 1550, SEQ ID NO: 1556, SEQ ID NO: 1562, SEQ ID NO: 1568, SEQ ID NO: 1574, SEQ ID NO: 1580, or SEQ ID NO: 1586 as shown in in Figure 3A, 3B, or 3C, and a heavy chain CDR3 comprising the amino acid sequence of any one of the HCDR3s in SEQ ID NO: 399, SEQ ID NO: 405, SEQ ID NO: 411, SEQ ID NO: 417, SEQ ID NO: 423, SEQ ID NO: 429, SEQ ID NO: 435, SEQ ID NO: 441, SEQ ID NO: 447, SEQ ID NO: 453, SEQ ID NO: 459, SEQ ID NO: 465, SEQ ID NO: 471, SEQ ID NO: 477, SEQ ID NO: 483, SEQ ID NO: 489, SEQ ID NO: 495, SEQ ID NO: 501, SEQ ID NO: 507, SEQ ID NO: 513, SEQ ID NO: 519, SEQ ID NO: 525, SEQ ID NO: 531, SEQ ID NO: 537, SEQ ID NO: 543, SEQ ID NO: 549, SEQ ID NO: 555, SEQ ID NO: 561, SEQ ID NO: 567, SEQ ID NO: 573, SEQ ID NO: 579, SEQ ID NO: 585, SEQ ID NO: 591, SEQ ID NO: 597, SEQ ID NO: 603, SEQ ID NO: 609, SEQ ID NO: 615, SEQ ID NO: 621, SEQ ID NO: 627, SEQ ID NO: 633, SEQ ID NO: 639, SEQ ID NO: 645, SEQ ID NO: 651, SEQ ID NO: 657, SEQ ID NO: 663, SEQ ID NO: 669, SEQ ID NO: 675, SEQ ID NO: 681, SEQ ID NO: 687, SEQ ID NO: 693, SEQ ID NO: 699, SEQ ID NO: 705, SEQ ID NO: 711, SEQ ID NO: 717, SEQ ID NO: 723, SEQ ID NO: 729, SEQ ID NO: 735, SEQ ID NO: 741, SEQ ID NO: 747, SEQ ID NO: 753, SEQ ID NO: 759, SEQ ID NO: 765, SEQ ID NO: 771, SEQ ID NO: 777, SEQ ID NO: 783, SEQ ID NO: 789, SEQ ID NO: 795, SEQ ID NO: 801, SEQ ID NO: 807, SEQ ID NO: 813, SEQ ID NO: 819, SEQ ID NO: 825, SEQ ID NO: 831, SEQ ID NO: 837, SEQ ID NO: 843, SEQ ID NO: 849, SEQ ID NO: 855, SEQ ID NO: 861, SEQ ID NO: 867, SEQ ID NO: 873, SEQ ID NO: 879, SEQ ID NO: 885, SEQ ID NO: 891, SEQ ID NO: 897, SEQ ID NO: 903, SEQ ID NO: 909, SEQ ID NO: 915, SEQ ID NO: 921, SEQ ID NO: 927, SEQ ID NO: 933, SEQ ID NO: 939, SEQ ID NO: 945, SEQ ID NO: 951, SEQ ID NO: 957, SEQ ID NO: 963, SEQ ID NO: 969, SEQ ID NO: 975, SEQ ID NO: 981, SEQ ID NO: 987, SEQ ID NO: 993, SEQ ID NO: 999, SEQ ID NO: 1005, SEQ ID NO: 1011, SEQ ID NO: 1017, SEQ ID NO: 1023, SEQ ID NO: 1029, SEQ ID NO: 1035, SEQ ID NO: 1041, SEQ ID NO: 1047, SEQ ID NO: 1053, SEQ ID NO: 1059, SEQ ID NO: 1065, SEQ ID NO: 1071, SEQ ID NO: 1077, SEQ ID NO: 1083, SEQ ID NO: 1089, SEQ ID NO: 1095, SEQ ID NO: 1101, SEQ ID NO: 1107, SEQ ID NO: 1113, SEQ ID NO: 1119, SEQ ID NO: 1125, SEQ ID NO: 1131, SEQ ID NO:

1137, SEQ ID NO: 1143, SEQ ID NO: 1149, SEQ ID NO: 1155, SEQ ID NO: 1161, SEQ ID NO: 1167, SEQ ID NO: 1173, SEQ ID NO: 1179, SEQ ID NO: 1185, SEQ ID NO: 1191, SEQ ID NO: 1197, SEQ ID NO: 1203, SEQ ID NO: 1209, SEQ ID NO: 1215, SEQ ID NO: 1221, SEQ ID NO: 1227, SEQ ID NO: 1233, SEQ ID NO: 1239, SEQ ID NO: 1245, SEQ ID NO: 1251, SEQ ID NO: 1257, SEQ ID NO: 1263, SEQ ID NO: 1269, SEQ ID NO: 1275, SEQ ID NO: 1281, SEQ ID NO: 1287, SEQ ID NO: 1293, SEQ ID NO: 1299, SEQ ID NO: 1305, SEQ ID NO: 1311, SEQ ID NO: 1317, SEQ ID NO: 1323, SEQ ID NO: 1329, SEQ ID NO: 1335, SEQ ID NO: 1341, SEQ ID NO: 1347, SEQ ID NO: 1353, SEQ ID NO: 1359, SEQ ID NO: 1365, SEQ ID NO: 1371, SEQ ID NO: 1377, SEQ ID NO: 1383, SEQ ID NO: 1389, SEQ ID NO: 1395, SEQ ID NO: 1401, SEQ ID NO: 1407, SEQ ID NO: 1413, SEQ ID NO: 1419, SEQ ID NO: 1425, SEQ ID NO: 1431, SEQ ID NO: 1437, SEQ ID NO: 1443, SEQ ID NO: 1449, SEQ ID NO: 1455, SEQ ID NO: 1461, SEQ ID NO: 1467, SEQ ID NO: 1473, SEQ ID NO: 1479, SEQ ID NO: 1485, SEQ ID NO: 1491, SEQ ID NO: 1497, SEQ ID NO: 1503, SEQ ID NO: 1509, SEQ ID NO: 1515, SEQ ID NO: 1521, SEQ ID NO: 1595, SEQ ID NO: 1527, SEQ ID NO: 1533, SEQ ID NO: 1539, SEQ ID NO: 1545, SEQ ID NO: 1551, SEQ ID NO: 1557, SEQ ID NO: 1563, SEQ ID NO: 1569, SEQ ID NO: 1575, SEQ ID NO: 1581, or SEQ ID NO: 1587 as shown in in Figure 3A, 3B, or 3C, and the HCDR1, HCDR2, and HCDR3 are from a same clone

[0198] In some embodiments, an isolated antigen binding molecule that binds to human TIGIT comprises a heavy chain CDR1 comprising the amino acid sequence of any of one of the HCDR1s in SEQ ID NO: 397, SEQ ID NO: 403. SEQ ID NO: 409, SEQ ID NO: 415, SEQ ID NO: 421, SEQ ID NO: 427, SEQ ID NO: 433, SEQ ID NO: 439, SEQ ID NO: 445, SEQ ID NO: 451, SEQ ID NO: 457, SEQ ID NO: 463, SEQ ID NO: 469, SEQ ID NO: 475, SEQ ID NO: 481, SEQ ID NO: 487, SEQ ID NO: 493, SEQ ID NO: 499, SEQ ID NO: 505, SEQ ID NO: 511, SEQ ID NO: 517, SEQ ID NO: 523, SEQ ID NO: 529, SEQ ID NO: 535, SEQ ID NO: 541, SEQ ID NO: 547, SEQ ID NO: 553, SEQ ID NO: 559, SEQ ID NO: 565, SEQ ID NO: 571, SEQ ID NO: 577, SEQ ID NO: 583, SEQ ID NO: 589, SEQ ID NO: 595, SEQ ID NO: 601, SEQ ID NO: 607, SEQ ID NO: 613, SEQ ID NO: 619, SEQ ID NO: 625, SEQ ID NO: 631, SEQ ID NO: 637, SEQ ID NO: 643, SEQ ID NO: 649, SEQ ID NO: 655, SEQ ID NO: 661, SEQ ID NO: 667, SEQ ID NO: 673, SEQ ID NO: 679, SEQ ID NO:

685, SEQ ID NO: 691, SEQ ID NO: 697, SEQ ID NO: 703, SEQ ID NO: 709, SEQ ID NO: 715, SEQ ID NO: 721, SEQ ID NO: 727, SEQ ID NO: 733, SEQ ID NO: 739, SEQ ID NO: 745, SEQ ID NO: 751, SEQ ID NO: 757, SEQ ID NO: 763, SEQ ID NO: 769, SEQ ID NO: 775, SEQ ID NO: 781, SEQ ID NO: 787, SEQ ID NO: 793, SEQ ID NO: 799, SEQ ID NO: 805, SEQ ID NO: 811, SEQ ID NO: 817, SEQ ID NO: 823, SEQ ID NO: 829, SEQ ID NO: 835, SEQ ID NO: 841, SEQ ID NO: 847, SEQ ID NO: 853, SEQ ID NO: 859, SEQ ID NO: 865, SEQ ID NO: 871, SEQ ID NO: 877, SEQ ID NO: 883, SEQ ID NO: 889, SEQ ID NO: 895, SEQ ID NO: 901, SEQ ID NO: 907, SEQ ID NO: 913, SEQ ID NO: 919, SEQ ID NO: 925, SEQ ID NO: 931, SEQ ID NO: 937, SEQ ID NO: 943, SEQ ID NO: 949, SEQ ID NO: 955, SEQ ID NO: 961, SEQ ID NO: 967, SEQ ID NO: 973, SEQ ID NO: 979, SEQ ID NO: 985, SEQ ID NO: 991, SEQ ID NO: 997, SEQ ID NO: 1003, SEQ ID NO: 1009, SEQ ID NO: 1015, SEQ ID NO: 1021, SEQ ID NO: 1027, SEQ ID NO: 1033, SEQ ID NO: 1039, SEQ ID NO: 1045, SEQ ID NO: 1051, SEQ ID NO: 1057, SEQ ID NO: 1063, SEQ ID NO: 1069, SEQ ID NO: 1075, SEQ ID NO: 1081, SEQ ID NO: 1087, SEQ ID NO: 1093, SEQ ID NO: 1099, SEQ ID NO: 1105, SEQ ID NO: 1111, SEQ ID NO: 1117, SEQ ID NO: 1123, SEQ ID NO: 1129, SEQ ID NO: 1135, SEQ ID NO: 1141, SEQ ID NO: 1147, SEQ ID NO: 1153, SEQ ID NO: 1159, SEQ ID NO: 1165, SEQ ID NO: 1171, SEQ ID NO: 1177, SEQ ID NO: 1183, SEQ ID NO: 1189, SEQ ID NO: 1195, SEQ ID NO: 1201, SEQ ID NO: 1207, SEQ ID NO: 1213, SEQ ID NO: 1219, SEQ ID NO: 1225, SEQ ID NO: 1231, SEQ ID NO: 1237, SEQ ID NO: 1243, SEQ ID NO: 1249, SEQ ID NO: 1255, SEQ ID NO: 1261, SEQ ID NO: 1267, SEQ ID NO: 1273, SEQ ID NO: 1279, SEQ ID NO: 1285, SEQ ID NO: 1291, SEQ ID NO: 1297, SEQ ID NO: 1303, SEQ ID NO: 1309, SEQ ID NO: 1315, SEQ ID NO: 1321, SEQ ID NO: 1327, SEQ ID NO: 1333, SEQ ID NO: 1339, SEQ ID NO: 1345, SEQ ID NO: 1351, SEQ ID NO: 1357, SEQ ID NO: 1363, SEQ ID NO: 1369, SEQ ID NO: 1375, SEQ ID NO: 1381, SEQ ID NO: 1387, SEQ ID NO: 1393, SEQ ID NO: 1399, SEQ ID NO: 1405, SEQ ID NO: 1411, SEQ ID NO: 1417, SEQ ID NO: 1423, SEQ ID NO: 1429, SEQ ID NO: 1435, SEQ ID NO: 1441, SEQ ID NO: 1447, SEQ ID NO: 1453, SEQ ID NO: 1459, SEQ ID NO: 1465, SEQ ID NO: 1471, SEQ ID NO: 1477, SEQ ID NO: 1483, SEQ ID NO: 1489, SEQ ID NO: 1495, SEQ ID NO: 1501, SEQ ID NO: 1507, SEQ ID NO: 1513, SEQ ID NO: 1519, SEQ ID NO: 1593, SEQ ID NO: 1525 SEQ ID NO: 1531, SEQ ID NO: 1537,

SEQ ID NO: 1543, SEQ ID NO: 1549, SEQ ID NO: 1555, SEQ ID NO: 1561, SEQ ID NO: 1567, SEQ ID NO: 1573, SEQ ID NO: 1579, or SEQ ID NO: 1585 as shown in Figure 3A, 3B, or 3C, a heavy chain CDR2 comprising the amino acid sequence of any one of the HCDR2s in SEQ ID NO: 398, SEQ ID NO: 404, SEQ ID NO: 410, SEQ ID NO: 416, SEQ ID NO: 422, SEQ ID NO: 428, SEQ ID NO: 434, SEQ ID NO: 440, SEQ ID NO: 446, SEQ ID NO: 452, SEQ ID NO: 458, SEQ ID NO: 464, SEQ ID NO: 470, SEQ ID NO: 476, SEQ ID NO: 482, SEQ ID NO: 488, SEQ ID NO: 494, SEQ ID NO: 500, SEQ ID NO: 506, SEQ ID NO: 512, SEQ ID NO: 518, SEQ ID NO: 524, SEQ ID NO: 530, SEQ ID NO: 536, SEQ ID NO: 542, SEQ ID NO: 548, SEQ ID NO: 554, SEQ ID NO: 560, SEQ ID NO: 566, SEQ ID NO: 572, SEQ ID NO: 578, SEQ ID NO: 584, SEQ ID NO: 590, SEQ ID NO: 596, SEQ ID NO: 602, SEQ ID NO: 608, SEQ ID NO: 614, SEQ ID NO: 620, SEQ ID NO: 626, SEQ ID NO: 632, SEQ ID NO: 638, SEQ ID NO: 644, SEQ ID NO: 650, SEQ ID NO: 656, SEQ ID NO: 662, SEQ ID NO: 668, SEQ ID NO: 674, SEQ ID NO: 680, SEQ ID NO: 686, SEQ ID NO: 692, SEQ ID NO: 698, SEQ ID NO: 704, SEQ ID NO: 710, SEQ ID NO: 716, SEQ ID NO: 722, SEQ ID NO: 728, SEQ ID NO: 734, SEQ ID NO: 740, SEQ ID NO: 746, SEQ ID NO: 752, SEQ ID NO: 758, SEQ ID NO: 764, SEQ ID NO: 770, SEQ ID NO: 776, SEQ ID NO: 782, SEQ ID NO: 788, SEQ ID NO: 794, SEQ ID NO: 800, SEQ ID NO: 806, SEQ ID NO: 812, SEQ ID NO: 818, SEQ ID NO: 824, SEQ ID NO: 830, SEQ ID NO: 836, SEQ ID NO: 842, SEQ ID NO: 848, SEQ ID NO: 854, SEQ ID NO: 860, SEQ ID NO: 866, SEQ ID NO: 872, SEQ ID NO: 878, SEQ ID NO: 884, SEQ ID NO: 890, SEQ ID NO: 896, SEQ ID NO: 902, SEQ ID NO: 908, SEQ ID NO: 914, SEQ ID NO: 920, SEQ ID NO: 926, SEQ ID NO: 932, SEQ ID NO: 938, SEQ ID NO: 944, SEQ ID NO: 950, SEQ ID NO: 956, SEQ ID NO: 962, SEQ ID NO: 968, SEQ ID NO: 974, SEQ ID NO: 980, SEQ ID NO: 986, SEQ ID NO: 992, SEQ ID NO: 998, SEQ ID NO: 1004, SEQ ID NO: 1010, SEQ ID NO: 1016, SEQ ID NO: 1022, SEQ ID NO: 1028, SEQ ID NO: 1034, SEQ ID NO: 1040, SEQ ID NO: 1046, SEQ ID NO: 1052, SEQ ID NO: 1058, SEQ ID NO: 1064, SEQ ID NO: 1070, SEQ ID NO: 1076, SEQ ID NO: 1082, SEQ ID NO: 1088, SEQ ID NO: 1094, SEQ ID NO: 1100, SEQ ID NO: 1106, SEQ ID NO: 1112, SEQ ID NO: 1118, SEQ ID NO: 1124, SEQ ID NO: 1130, SEQ ID NO: 1136, SEQ ID NO: 1142, SEQ ID NO: 1148, SEQ ID NO: 1154, SEQ ID NO: 1160, SEQ ID NO: 1166, SEQ ID NO: 1172, SEQ ID NO: 1178, SEQ ID NO: 1184,

SEQ ID NO: 1190, SEQ ID NO: 1196, SEQ ID NO: 1202, SEQ ID NO: 1208, SEQ ID NO: 1214, SEQ ID NO: 1220, SEQ ID NO: 1226, SEQ ID NO: 1232, SEQ ID NO: 1238, SEQ ID NO: 1244, SEQ ID NO: 1250, SEQ ID NO: 1256, SEQ ID NO: 1262, SEQ ID NO: 1268, SEQ ID NO: 1274, SEQ ID NO: 1280, SEQ ID NO: 1286, SEQ ID NO: 1292, SEQ ID NO: 1298, SEQ ID NO: 1304, SEQ ID NO: 1310, SEQ ID NO: 1316, SEQ ID NO: 1322, SEQ ID NO: 1328, SEQ ID NO: 1334, SEQ ID NO: 1340, SEQ ID NO: 1346, SEQ ID NO: 1352, SEQ ID NO: 1358, SEQ ID NO: 1364, SEQ ID NO: 1370, SEQ ID NO: 1376, SEQ ID NO: 1382, SEQ ID NO: 1388, SEQ ID NO: 1394, SEQ ID NO: 1400, SEQ ID NO: 1406, SEQ ID NO: 1412, SEQ ID NO: 1418, SEQ ID NO: 1424, SEQ ID NO: 1430, SEQ ID NO: 1436, SEQ ID NO: 1442, SEQ ID NO: 1448, SEQ ID NO: 1454, SEQ ID NO: 1460, SEQ ID NO: 1466, SEQ ID NO: 1472, SEQ ID NO: 1478, SEQ ID NO: 1484, SEQ ID NO: 1490, SEQ ID NO: 1496, SEQ ID NO: 1502, SEQ ID NO: 1508, SEQ ID NO: 1514, SEQ ID NO: 1520, SEQ ID NO: 1594, SEQ ID NO: 1526, SEQ ID NO: 1532, SEQ ID NO: 1538, SEQ ID NO: 1544, SEQ ID NO: 1550, SEQ ID NO: 1556, SEQ ID NO: 1562, SEQ ID NO: 1568, SEQ ID NO: 1574, SEQ ID NO: 1580, or SEQ ID NO: 1586 as shown in Figure 3A, 3B, or 3C, a heavy chain CDR3 comprising the amino acid sequence of any one of the HCDR3s in SEQ ID NO: 399, SEQ ID NO: 405, SEQ ID NO: 411, SEQ ID NO: 417, SEQ ID NO: 423, SEQ ID NO: 429, SEQ ID NO: 435, SEQ ID NO: 441, SEQ ID NO: 447, SEQ ID NO: 453, SEQ ID NO: 459, SEQ ID NO: 465, SEQ ID NO: 471, SEQ ID NO: 477, SEQ ID NO: 483, SEQ ID NO: 489, SEQ ID NO: 495, SEQ ID NO: 501, SEQ ID NO: 507, SEQ ID NO: 513, SEQ ID NO: 519, SEQ ID NO: 525, SEQ ID NO: 531, SEQ ID NO: 537, SEQ ID NO: 543, SEQ ID NO: 549, SEQ ID NO: 555, SEQ ID NO: 561, SEQ ID NO: 567, SEQ ID NO: 573, SEQ ID NO: 579, SEQ ID NO: 585, SEQ ID NO: 591, SEQ ID NO: 597, SEQ ID NO: 603, SEQ ID NO: 609, SEQ ID NO: 615, SEQ ID NO: 621, SEQ ID NO: 627, SEQ ID NO: 633, SEQ ID NO: 639, SEQ ID NO: 645, SEQ ID NO: 651, SEQ ID NO: 657, SEQ ID NO: 663, SEQ ID NO: 669, SEQ ID NO: 675, SEQ ID NO: 681, SEQ ID NO: 687, SEQ ID NO: 693, SEQ ID NO: 699, SEQ ID NO: 705, SEQ ID NO: 711, SEQ ID NO: 717, SEQ ID NO: 723, SEQ ID NO: 729, SEQ ID NO: 735, SEQ ID NO: 741, SEQ ID NO: 747, SEQ ID NO: 753, SEQ ID NO: 759, SEQ ID NO: 765, SEQ ID NO: 771, SEQ ID NO: 777, SEQ ID NO: 783, SEQ ID NO: 789, SEQ ID NO: 795, SEQ ID NO: 801, SEQ ID NO: 807, SEQ ID NO: 813, SEQ

ID NO: 819, SEQ ID NO: 825, SEQ ID NO: 831, SEQ ID NO: 837, SEQ ID NO: 843, SEQ ID NO: 849, SEQ ID NO: 855, SEQ ID NO: 861, SEQ ID NO: 867, SEQ ID NO: 873, SEQ ID NO: 879, SEQ ID NO: 885, SEQ ID NO: 891, SEQ ID NO: 897, SEQ ID NO: 903, SEQ ID NO: 909, SEQ ID NO: 915, SEQ ID NO: 921, SEQ ID NO: 927, SEQ ID NO: 933, SEQ ID NO: 939, SEQ ID NO: 945, SEQ ID NO: 951, SEQ ID NO: 957, SEQ ID NO: 963, SEQ ID NO: 969, SEQ ID NO: 975, SEQ ID NO: 981, SEQ ID NO: 987, SEQ ID NO: 993, SEQ ID NO: 999, SEQ ID NO: 1005, SEQ ID NO: 1011, SEQ ID NO: 1017, SEQ ID NO: 1023, SEQ ID NO: 1029, SEQ ID NO: 1035, SEQ ID NO: 1041, SEQ ID NO: 1047, SEQ ID NO: 1053, SEQ ID NO: 1059, SEQ ID NO: 1065, SEQ ID NO: 1071, SEQ ID NO: 1077, SEQ ID NO: 1083, SEQ ID NO: 1089, SEQ ID NO: 1095, SEQ ID NO: 1101, SEQ ID NO: 1107, SEQ ID NO: 1113, SEQ ID NO: 1119, SEQ ID NO: 1125, SEQ ID NO: 1131, SEQ ID NO: 1137, SEQ ID NO: 1143, SEQ ID NO: 1149, SEQ ID NO: 1155, SEQ ID NO: 1161, SEQ ID NO: 1167, SEQ ID NO: 1173, SEQ ID NO: 1179, SEQ ID NO: 1185, SEQ ID NO: 1191, SEQ ID NO: 1197, SEQ ID NO: 1203, SEQ ID NO: 1209, SEQ ID NO: 1215, SEQ ID NO: 1221, SEQ ID NO: 1227, SEQ ID NO: 1233, SEQ ID NO: 1239, SEQ ID NO: 1245, SEQ ID NO: 1251, SEQ ID NO: 1257, SEQ ID NO: 1263, SEQ ID NO: 1269, SEQ ID NO: 1275, SEQ ID NO: 1281, SEQ ID NO: 1287, SEQ ID NO: 1293, SEQ ID NO: 1299, SEQ ID NO: 1305, SEQ ID NO: 1311, SEQ ID NO: 1317, SEQ ID NO: 1323, SEQ ID NO: 1329, SEQ ID NO: 1335, SEQ ID NO: 1341, SEQ ID NO: 1347, SEQ ID NO: 1353, SEQ ID NO: 1359, SEQ ID NO: 1365, SEQ ID NO: 1371, SEQ ID NO: 1377, SEQ ID NO: 1383, SEQ ID NO: 1389, SEQ ID NO: 1395, SEQ ID NO: 1401, SEQ ID NO: 1407, SEQ ID NO: 1413, SEQ ID NO: 1419, SEQ ID NO: 1425, SEQ ID NO: 1431, SEQ ID NO: 1437, SEQ ID NO: 1443, SEQ ID NO: 1449, SEQ ID NO: 1455, SEQ ID NO: 1461, SEQ ID NO: 1467, SEQ ID NO: 1473, SEQ ID NO: 1479, SEQ ID NO: 1485, SEQ ID NO: 1491, SEQ ID NO: 1497, SEQ ID NO: 1503, SEQ ID NO: 1509, SEQ ID NO: 1515, SEQ ID NO: 1521, SEQ ID NO: 1595, SEQ ID NO: 1527, SEQ ID NO: 1533, SEQ ID NO: 1539, SEQ ID NO: 1545, SEQ ID NO: 1551, SEQ ID NO: 1557, SEQ ID NO: 1563, SEQ ID NO: 1569, SEQ ID NO: 1575, SEQ ID NO: 1581, or SEQ ID NO: 1587 as shown in in Figure 3A, 3B, or 3C, a light chain CDR1 comprising the amino acid sequence of any one of the LCDR1s in SEQ ID NO: 400, SEQ ID NO: 406, SEQ ID NO: 412, SEQ ID NO: 418, SEQ ID NO: 424, SEQ ID NO: 430, SEQ ID

NO: 436, SEQ ID NO: 442, SEQ ID NO: 448, SEQ ID NO: 454, SEQ ID NO: 460, SEQ ID NO: 466, SEQ ID NO: 472, SEQ ID NO: 478, SEQ ID NO: 484, SEQ ID NO: 490, SEQ ID NO: 496, SEQ ID NO: 502, SEQ ID NO: 508, SEQ ID NO: 514, SEQ ID NO: 520, SEQ ID NO: 526, SEQ ID NO: 532, SEQ ID NO: 538, SEQ ID NO: 544, SEQ ID NO: 550, SEQ ID NO: 556, SEQ ID NO: 562, SEQ ID NO: 568, SEQ ID NO: 574, SEQ ID NO: 580, SEQ ID NO: 586, SEQ ID NO: 592, SEQ ID NO: 598, SEQ ID NO: 604, SEQ ID NO: 610, SEQ ID NO: 616, SEQ ID NO: 622, SEQ ID NO: 628, SEQ ID NO: 634, SEQ ID NO: 640, SEQ ID NO: 646, SEQ ID NO: 652, SEQ ID NO: 658, SEQ ID NO: 664, SEQ ID NO: 670, SEQ ID NO: 676, SEQ ID NO: 682, SEQ ID NO: 688, SEQ ID NO: 694, SEQ ID NO: 700, SEQ ID NO: 706, SEQ ID NO: 712, SEQ ID NO: 718, SEQ ID NO: 724, SEQ ID NO: 730, SEQ ID NO: 736, SEQ ID NO: 742, SEQ ID NO: 748, SEQ ID NO: 754, SEQ ID NO: 760, SEQ ID NO: 766, SEQ ID NO: 772, SEQ ID NO: 778, SEQ ID NO: 784, SEQ ID NO: 790, SEQ ID NO: 796, SEQ ID NO: 802, SEQ ID NO: 808, SEQ ID NO: 814, SEQ ID NO: 820, SEQ ID NO: 826, SEQ ID NO: 832, SEQ ID NO: 838, SEQ ID NO: 844, SEQ ID NO: 850, SEQ ID NO: 856, SEQ ID NO: 862, SEQ ID NO: 868, SEQ ID NO: 874, SEQ ID NO: 880, SEQ ID NO: 886, SEQ ID NO: 892, SEQ ID NO: 898, SEQ ID NO: 904, SEQ ID NO: 910, SEQ ID NO: 916, SEQ ID NO: 922, SEQ ID NO: 928, SEQ ID NO: 934, SEQ ID NO: 940, SEQ ID NO: 946, SEQ ID NO: 952, SEQ ID NO: 958, SEQ ID NO: 964, SEQ ID NO: 970, SEQ ID NO: 976, SEQ ID NO: 982, SEQ ID NO: 988, SEQ ID NO: 994, SEQ ID NO: 1000, SEQ ID NO: 1006, SEQ ID NO: 1012, SEQ ID NO: 1018, SEQ ID NO: 1024, SEQ ID NO: 1030, SEQ ID NO: 1036, SEQ ID NO: 1042, SEQ ID NO: 1048, SEQ ID NO: 1054, SEQ ID NO: 1060, SEQ ID NO: 1066, SEQ ID NO: 1072, SEQ ID NO: 1078, SEQ ID NO: 1084, SEQ ID NO: 1090, SEQ ID NO: 1096, SEQ ID NO: 1102, SEQ ID NO: 1108, SEQ ID NO: 1114, SEQ ID NO: 1120, SEQ ID NO: 1126, SEQ ID NO: 1132, SEQ ID NO: 1138, SEQ ID NO: 1144, SEQ ID NO: 1150, SEQ ID NO: 1156, SEQ ID NO: 1162, SEQ ID NO: 1168, SEQ ID NO: 1174, SEQ ID NO: 1180, SEQ ID NO: 1186, SEQ ID NO: 1192, SEQ ID NO: 1198, SEQ ID NO: 1204, SEQ ID NO: 1210, SEQ ID NO: 1216, SEQ ID NO: 1222, SEQ ID NO: 1228, SEQ ID NO: 1234, SEQ ID NO: 1240, SEQ ID NO: 1246, SEQ ID NO: 1252, SEQ ID NO: 1258, SEQ ID NO: 1264, SEQ ID NO: 1270, SEQ ID NO: 1276, SEQ ID NO: 1282, SEQ ID NO: 1288, SEQ ID NO: 1294, SEQ ID NO: 1300, SEQ ID NO: 1306, SEQ ID NO:

1312, SEQ ID NO: 1318, SEQ ID NO: 1324, SEQ ID NO: 1330, SEQ ID NO: 1336, SEQ ID NO: 1342, SEQ ID NO: 1348, SEQ ID NO: 1354, SEQ ID NO: 1360, SEQ ID NO: 1366, SEQ ID NO: 1372, SEQ ID NO: 1378, SEQ ID NO: 1384, SEQ ID NO: 1390, SEQ ID NO: 1396, SEQ ID NO: 1402, SEQ ID NO: 1408, SEQ ID NO: 1414, SEQ ID NO: 1420, SEQ ID NO: 1426, SEQ ID NO: 1432, SEQ ID NO: 1438, SEQ ID NO: 1444, SEQ ID NO: 1450. SEQ ID NO: 1456, SEQ ID NO: 1462, SEQ ID NO: 1468, SEQ ID NO: 1474, SEQ ID NO: 1480, SEQ ID NO: 1486, SEQ ID NO: 1492, SEQ ID NO: 1498, SEQ ID NO: 1504, SEQ ID NO: 1510, SEQ ID NO: 1516, SEQ ID NO: 1522, SEQ ID NO: 1596, SEQ ID NO: 1528, SEQ ID NO: 1534, SEQ ID NO: 1540, SEQ ID NO: 1546, SEQ ID NO: 1552, SEQ ID NO: 1558, SEQ ID NO: 1564, SEQ ID NO: 1570, SEQ ID NO: 1576, SEQ ID NO: 1582, or SEQ ID NO: 1588 as shown in Figure 3A, 3B, or 3C, a light chain CDR2 comprising the amino acid sequence of any one of the LCDR2s in SEQ ID NO: 401, SEQ ID NO: 407, SEQ ID NO: 413, SEQ ID NO: 419, SEQ ID NO: 425, SEQ ID NO: 431, SEQ ID NO: 437, SEQ ID NO: 443, SEQ ID NO: 449, SEQ ID NO: 455, SEQ ID NO: 461, SEQ ID NO: 467, SEQ ID NO: 473, SEQ ID NO: 479, SEQ ID NO: 485, SEQ ID NO: 491, SEQ ID NO: 497, SEQ ID NO: 503, SEQ ID NO: 509, SEQ ID NO: 515, SEQ ID NO: 521, SEQ ID NO: 527, SEQ ID NO: 533, SEQ ID NO: 539, SEQ ID NO: 545, SEQ ID NO: 551, SEQ ID NO: 557, SEQ ID NO: 563, SEQ ID NO: 569, SEQ ID NO: 575, SEQ ID NO: 581, SEQ ID NO: 587, SEQ ID NO: 593, SEQ ID NO: 599, SEQ ID NO: 605, SEQ ID NO: 611, SEQ ID NO: 617, SEQ ID NO: 623, SEQ ID NO: 629, SEQ ID NO: 635, SEQ ID NO: 641, SEQ ID NO: 647, SEQ ID NO: 653, SEQ ID NO: 659, SEQ ID NO: 665, SEQ ID NO: 671, SEQ ID NO: 677, SEQ ID NO: 683, SEQ ID NO: 689, SEQ ID NO: 695, SEQ ID NO: 701, SEQ ID NO: 707, SEQ ID NO: 713, SEQ ID NO: 719, SEQ ID NO: 725, SEQ ID NO: 731, SEQ ID NO: 737, SEQ ID NO: 743, SEQ ID NO: 749, SEQ ID NO: 755, SEQ ID NO: 761, SEQ ID NO: 767, SEQ ID NO: 773, SEQ ID NO: 779, SEQ ID NO: 785, SEQ ID NO: 791, SEQ ID NO: 797, SEQ ID NO: 803, SEQ ID NO: 809, SEQ ID NO: 815, SEQ ID NO: 821, SEQ ID NO: 827, SEQ ID NO: 833, SEQ ID NO: 839, SEQ ID NO: 845, SEQ ID NO: 851, SEQ ID NO: 857, SEQ ID NO: 863, SEQ ID NO: 869, SEQ ID NO: 875, SEQ ID NO: 881, SEQ ID NO: 887, SEQ ID NO: 893, SEQ ID NO: 899, SEQ ID NO: 905, SEQ ID NO: 911, SEQ ID NO: 917, SEQ ID NO: 923, SEQ ID NO: 929, SEQ ID NO: 935, SEQ ID NO: 941, SEQ ID NO: 947, SEQ ID

NO: 953, SEQ ID NO: 959, SEQ ID NO: 965, SEQ ID NO: 971, SEQ ID NO: 977, SEQ ID NO: 983, SEQ ID NO: 989, SEQ ID NO: 995, SEQ ID NO: 1001, SEQ ID NO: 1007, SEQ ID NO: 1013, SEQ ID NO: 1019, SEQ ID NO: 1025, SEQ ID NO: 1031, SEQ ID NO: 1037, SEQ ID NO: 1043, SEQ ID NO: 1049, SEQ ID NO: 1055, SEQ ID NO: 1061, SEQ ID NO: 1067, SEQ ID NO: 1073, SEQ ID NO: 1079, SEQ ID NO: 1085, SEQ ID NO: 1091, SEQ ID NO: 1097, SEQ ID NO: 1103, SEQ ID NO: 1109, SEQ ID NO: 1115, SEQ ID NO: 1121, SEQ ID NO: 1127, SEQ ID NO: 1133, SEQ ID NO: 1139, SEQ ID NO: 1145, SEQ ID NO: 1151, SEQ ID NO: 1157, SEQ ID NO: 1163, SEQ ID NO: 1169, SEQ ID NO: 1175, SEQ ID NO: 1181, SEQ ID NO: 1187, SEQ ID NO: 1193, SEQ ID NO: 1199, SEQ ID NO: 1205, SEQ ID NO: 1211, SEQ ID NO: 1217, SEQ ID NO: 1223, SEQ ID NO: 1229, SEQ ID NO: 1235, SEQ ID NO: 1241, SEQ ID NO: 1247, SEQ ID NO: 1253, SEQ ID NO: 1259, SEQ ID NO: 1265, SEQ ID NO: 1271, SEQ ID NO: 1277, SEQ ID NO: 1283, SEQ ID NO: 1289, SEQ ID NO: 1295, SEQ ID NO: 1301, SEQ ID NO: 1307, SEQ ID NO: 1313, SEQ ID NO: 1319, SEQ ID NO: 1325, SEQ ID NO: 1331, SEQ ID NO: 1337, SEQ ID NO: 1343, SEQ ID NO: 1349, SEQ ID NO: 1355, SEQ ID NO: 1361, SEQ ID NO: 1367, SEQ ID NO: 1373, SEQ ID NO: 1379, SEQ ID NO: 1385, SEQ ID NO: 1391, SEQ ID NO: 1397, SEQ ID NO: 1403, SEQ ID NO: 1409, SEQ ID NO: 1415, SEQ ID NO: 1421, SEQ ID NO: 1427, SEQ ID NO: 1433, SEQ ID NO: 1439, SEQ ID NO: 1445, SEQ ID NO: 1451, SEQ ID NO: 1457, SEQ ID NO: 1463, SEQ ID NO: 1469, SEQ ID NO: 1475, SEQ ID NO: 1481, SEQ ID NO: 1487, SEQ ID NO: 1493, SEQ ID NO: 1499, SEQ ID NO: 1505, SEQ ID NO: 1511, SEQ ID NO: 1517, SEQ ID NO: 1523, SEQ ID NO: 1597, SEQ ID NO: 1529, SEQ ID NO: 1535, SEQ ID NO: 1541, SEQ ID NO: 1547, SEQ ID NO: 1553, SEQ ID NO: 1559, SEQ ID NO: 1565, SEQ ID NO: 1571, SEQ ID NO: 1577, SEQ ID NO: 1583, or SEQ ID NO: 1589 as shown in Figure 3A, 3B, or 3C, and a light chain CDR3 comprising the amino acid sequence of any one of the LCDR3s in SEQ ID NO: 402, SEQ ID NO: 408, SEQ ID NO: 414, SEQ ID NO: 420, SEQ ID NO: 426, SEQ ID NO: 432, SEQ ID NO: 438, SEQ ID NO: 444, SEQ ID NO: 450, SEQ ID NO: 456, SEQ ID NO: 462, SEQ ID NO: 468, SEQ ID NO: 474, SEQ ID NO: 480, SEQ ID NO: 486, SEQ ID NO: 492, SEQ ID NO: 498, SEQ ID NO: 504, SEQ ID NO: 510, SEQ ID NO: 516, SEQ ID NO: 522, SEQ ID NO: 528, SEQ ID NO: 534, SEQ ID NO: 540, SEQ ID NO: 546, SEQ ID NO: 552, SEQ ID NO: 558, SEQ ID NO: 564, SEQ ID

NO: 570, SEQ ID NO: 576, SEQ ID NO: 582, SEQ ID NO: 588, SEQ ID NO: 594, SEQ ID NO: 600, SEQ ID NO: 606, SEQ ID NO: 612, SEQ ID NO: 618, SEQ ID NO: 624, SEQ ID NO: 630, SEQ ID NO: 636, SEQ ID NO: 642, SEQ ID NO: 648, SEQ ID NO: 654, SEQ ID NO: 660, SEQ ID NO: 666, SEQ ID NO: 672, SEQ ID NO: 678, SEQ ID NO: 684, SEQ ID NO: 690, SEQ ID NO: 696, SEQ ID NO: 702, SEQ ID NO: 708, SEQ ID NO: 714, SEQ ID NO: 720, SEQ ID NO: 726, SEQ ID NO: 732, SEQ ID NO: 738, SEQ ID NO: 744, SEQ ID NO: 750, SEQ ID NO: 756, SEQ ID NO: 762, SEQ ID NO: 768, SEQ ID NO: 774, SEQ ID NO: 780, SEQ ID NO: 786, SEQ ID NO: 792, SEQ ID NO: 798, SEQ ID NO: 804, SEQ ID NO: 810, SEQ ID NO: 816, SEQ ID NO: 822, SEQ ID NO: 828, SEQ ID NO: 834, SEQ ID NO: 840, SEQ ID NO: 846, SEQ ID NO: 852, SEQ ID NO: 858, SEQ ID NO: 864, SEQ ID NO: 870, SEQ ID NO: 876, SEQ ID NO: 882, SEQ ID NO: 888, SEQ ID NO: 894, SEQ ID NO: 900, SEQ ID NO: 906, SEQ ID NO: 912, SEQ ID NO: 918, SEQ ID NO: 924, SEQ ID NO: 930, SEQ ID NO: 936, SEQ ID NO: 942, SEQ ID NO: 948, SEQ ID NO: 954, SEQ ID NO: 960, SEQ ID NO: 966, SEQ ID NO: 972, SEQ ID NO: 978, SEQ ID NO: 984, SEQ ID NO: 990, SEQ ID NO: 996, SEQ ID NO: 1002, SEQ ID NO: 1008, SEQ ID NO: 1014, SEQ ID NO: 1020, SEQ ID NO: 1026, SEQ ID NO: 1032, SEQ ID NO: 1038, SEQ ID NO: 1044, SEQ ID NO: 1050, SEQ ID NO: 1056, SEQ ID NO: 1062, SEQ ID NO: 1068, SEQ ID NO: 1074, SEQ ID NO: 1080, SEQ ID NO: 1086, SEQ ID NO: 1092, SEQ ID NO: 1098, SEQ ID NO: 1104, SEQ ID NO: 1110, SEQ ID NO: 1116, SEQ ID NO: 1122, SEQ ID NO: 1128, SEQ ID NO: 1134, SEQ ID NO: 1140, SEQ ID NO: 1146, SEQ ID NO: 1152, SEQ ID NO: 1158, SEQ ID NO: 1164, SEQ ID NO: 1170, SEQ ID NO: 1176, SEQ ID NO: 1182, SEQ ID NO: 1188, SEQ ID NO: 1194, SEQ ID NO: 1200, SEQ ID NO: 1206, SEQ ID NO: 1212, SEQ ID NO: 1218, SEQ ID NO: 1224, SEQ ID NO: 1230, SEQ ID NO: 1236, SEQ ID NO: 1242, SEQ ID NO: 1248, SEQ ID NO: 1254, SEQ ID NO: 1260, SEQ ID NO: 1266, SEQ ID NO: 1272, SEQ ID NO: 1278, SEQ ID NO: 1284, SEQ ID NO: 1290, SEQ ID NO: 1296, SEQ ID NO: 1302, SEQ ID NO: 1308, SEQ ID NO: 1314, SEQ ID NO: 1320, SEQ ID NO: 1326, SEQ ID NO: 1332, SEQ ID NO: 1338, SEQ ID NO: 1344, SEQ ID NO: 1350, SEQ ID NO: 1356, SEQ ID NO: 1362, SEQ ID NO: 1368, SEQ ID NO: 1374, SEQ ID NO: 1380, SEQ ID NO: 1386, SEQ ID NO: 1392, SEQ ID NO: 1398, SEQ ID NO: 1404, SEQ ID NO: 1410, SEQ ID NO: 1416, SEQ ID NO: 1422, SEQ ID NO: 1428, SEQ ID NO: 1434, SEQ ID

NO: 1440, SEQ ID NO: 1446, SEQ ID NO: 1452, SEQ ID NO: 1458, SEQ ID NO: 1464, SEQ ID NO: 1470, SEQ ID NO: 1476, SEQ ID NO: 1482, SEQ ID NO: 1488, SEQ ID NO: 1494, SEQ ID NO: 1500, SEQ ID NO: 1506, SEQ ID NO: 1512, SEQ ID NO: 1518, SEQ ID NO: 1524, SEQ ID NO: 1598, SEQ ID NO: 1530, SEQ ID NO: 1536, SEQ ID NO: 1542, SEQ ID NO: 1548, SEQ ID NO: 1554, SEQ ID NO: 1560, SEQ ID NO: 1566, SEQ ID NO: 1572, SEQ ID NO: 1578, SEQ ID NO: 1584, or SEQ ID NO: 1590 as shown in Figure 3A, 3B, or 3C.

[0199] In some embodiments, an isolated antigen binding molecule that binds to human TIGIT comprises a heavy chain CDR1 comprising the amino acid sequence of any of one of the HCDR1s in SEQ ID NO: 397, SEQ ID NO: 403. SEQ ID NO: 409, SEQ ID NO: 415, SEQ ID NO: 421, SEQ ID NO: 427, SEQ ID NO: 433, SEQ ID NO: 439, SEQ ID NO: 445, SEQ ID NO: 451, SEQ ID NO: 457, SEQ ID NO: 463, SEQ ID NO: 469, SEQ ID NO: 475, SEQ ID NO: 481, SEQ ID NO: 487, SEQ ID NO: 493, SEQ ID NO: 499, SEQ ID NO: 505, SEQ ID NO: 511, SEQ ID NO: 517, SEQ ID NO: 523, SEQ ID NO: 529, SEQ ID NO: 535, SEQ ID NO: 541, SEQ ID NO: 547, SEQ ID NO: 553, SEQ ID NO: 559, SEQ ID NO: 565, SEQ ID NO: 571, SEQ ID NO: 577, SEQ ID NO: 583, SEQ ID NO: 589, SEQ ID NO: 595, SEQ ID NO: 601, SEQ ID NO: 607, SEQ ID NO: 613, SEQ ID NO: 619, SEQ ID NO: 625, SEQ ID NO: 631, SEQ ID NO: 637, SEQ ID NO: 643, SEQ ID NO: 649, SEQ ID NO: 655, SEQ ID NO: 661, SEQ ID NO: 667, SEQ ID NO: 673, SEQ ID NO: 679, SEQ ID NO: 685, SEQ ID NO: 691, SEQ ID NO: 697, SEQ ID NO: 703, SEQ ID NO: 709, SEQ ID NO: 715, SEQ ID NO: 721, SEQ ID NO: 727, SEQ ID NO: 733, SEQ ID NO: 739, SEQ ID NO: 745, SEQ ID NO: 751, SEQ ID NO: 757, SEQ ID NO: 763, SEQ ID NO: 769, SEQ ID NO: 775, SEQ ID NO: 781, SEQ ID NO: 787, SEQ ID NO: 793, SEQ ID NO: 799, SEQ ID NO: 805, SEQ ID NO: 811, SEQ ID NO: 817, SEQ ID NO: 823, SEQ ID NO: 829, SEQ ID NO: 835, SEQ ID NO: 841, SEQ ID NO: 847, SEQ ID NO: 853, SEQ ID NO: 859, SEQ ID NO: 865, SEQ ID NO: 871, SEQ ID NO: 877, SEQ ID NO: 883, SEQ ID NO: 889, SEQ ID NO: 895, SEQ ID NO: 901, SEQ ID NO: 907, SEQ ID NO: 913, SEQ ID NO: 919, SEQ ID NO: 925, SEQ ID NO: 931, SEQ ID NO: 937, SEQ ID NO: 943, SEQ ID NO: 949, SEQ ID NO: 955, SEQ ID NO: 961, SEQ ID NO: 967, SEQ ID NO: 973, SEQ ID NO: 979, SEQ ID NO: 985, SEQ ID NO: 991, SEQ ID NO: 997, SEQ ID NO: 1003, SEQ ID NO: 1009, SEQ ID

NO: 1015, SEQ ID NO: 1021, SEQ ID NO: 1027, SEQ ID NO: 1033, SEQ ID NO: 1039, SEQ ID NO: 1045, SEQ ID NO: 1051, SEQ ID NO: 1057, SEQ ID NO: 1063, SEQ ID NO: 1069, SEQ ID NO: 1075, SEQ ID NO: 1081, SEQ ID NO: 1087, SEQ ID NO: 1093, SEQ ID NO: 1099, SEQ ID NO: 1105, SEQ ID NO: 1111, SEQ ID NO: 1117, SEQ ID NO: 1123, SEQ ID NO: 1129, SEQ ID NO: 1135, SEQ ID NO: 1141, SEQ ID NO: 1147, SEQ ID NO: 1153, SEQ ID NO: 1159, SEQ ID NO: 1165, SEQ ID NO: 1171, SEQ ID NO: 1177, SEQ ID NO: 1183, SEQ ID NO: 1189, SEQ ID NO: 1195, SEQ ID NO: 1201, SEQ ID NO: 1207, SEQ ID NO: 1213, SEQ ID NO: 1219, SEQ ID NO: 1225, SEQ ID NO: 1231, SEQ ID NO: 1237, SEQ ID NO: 1243, SEQ ID NO: 1249, SEQ ID NO: 1255, SEQ ID NO: 1261, SEQ ID NO: 1267, SEQ ID NO: 1273, SEQ ID NO: 1279, SEQ ID NO: 1285, SEQ ID NO: 1291, SEQ ID NO: 1297, SEQ ID NO: 1303, SEQ ID NO: 1309, SEQ ID NO: 1315, SEQ ID NO: 1321, SEQ ID NO: 1327, SEQ ID NO: 1333, SEQ ID NO: 1339, SEQ ID NO: 1345, SEQ ID NO: 1351, SEQ ID NO: 1357, SEQ ID NO: 1363, SEQ ID NO: 1369, SEQ ID NO: 1375, SEQ ID NO: 1381, SEQ ID NO: 1387, SEQ ID NO: 1393, SEQ ID NO: 1399, SEQ ID NO: 1405, SEQ ID NO: 1411, SEQ ID NO: 1417, SEQ ID NO: 1423, SEQ ID NO: 1429, SEQ ID NO: 1435, SEQ ID NO: 1441, SEQ ID NO: 1447, SEQ ID NO: 1453, SEQ ID NO: 1459, SEQ ID NO: 1465, SEQ ID NO: 1471, SEQ ID NO: 1477, SEQ ID NO: 1483, SEQ ID NO: 1489, SEQ ID NO: 1495, SEQ ID NO: 1501, SEQ ID NO: 1507, SEQ ID NO: 1513, SEQ ID NO: 1519, SEQ ID NO: 1593, SEQ ID NO: 1525 SEQ ID NO: 1531, SEQ ID NO: 1537, SEQ ID NO: 1543, SEQ ID NO: 1549, SEQ ID NO: 1555, SEQ ID NO: 1561, SEQ ID NO: 1567, SEQ ID NO: 1573, SEQ ID NO: 1579, or SEQ ID NO: 1585 as shown in Figure 3A, 3B, or 3C, a heavy chain CDR2 comprising the amino acid sequence of any one of the HCDR2s in SEQ ID NO: 398, SEQ ID NO: 404, SEQ ID NO: 410, SEQ ID NO: 416, SEQ ID NO: 422, SEQ ID NO: 428, SEQ ID NO: 434, SEQ ID NO: 440, SEQ ID NO: 446, SEQ ID NO: 452, SEQ ID NO: 458, SEQ ID NO: 464, SEQ ID NO: 470, SEQ ID NO: 476, SEQ ID NO: 482, SEQ ID NO: 488, SEQ ID NO: 494, SEQ ID NO: 500, SEQ ID NO: 506, SEQ ID NO: 512, SEQ ID NO: 518, SEQ ID NO: 524, SEQ ID NO: 530, SEQ ID NO: 536, SEQ ID NO: 542, SEQ ID NO: 548, SEQ ID NO: 554, SEQ ID NO: 560, SEQ ID NO: 566, SEQ ID NO: 572, SEQ ID NO: 578, SEQ ID NO: 584, SEQ ID NO: 590, SEQ ID NO: 596, SEQ ID NO: 602, SEQ ID NO: 608, SEQ ID NO: 614, SEQ ID NO: 620, SEQ ID NO: 626, SEQ

ID NO: 632, SEQ ID NO: 638, SEQ ID NO: 644, SEQ ID NO: 650, SEQ ID NO: 656, SEQ ID NO: 662, SEQ ID NO: 668, SEQ ID NO: 674, SEQ ID NO: 680, SEQ ID NO: 686, SEQ ID NO: 692, SEQ ID NO: 698, SEQ ID NO: 704, SEQ ID NO: 710, SEQ ID NO: 716, SEQ ID NO: 722, SEQ ID NO: 728, SEQ ID NO: 734, SEQ ID NO: 740, SEQ ID NO: 746, SEQ ID NO: 752, SEQ ID NO: 758, SEQ ID NO: 764, SEQ ID NO: 770, SEQ ID NO: 776, SEQ ID NO: 782, SEQ ID NO: 788, SEQ ID NO: 794, SEQ ID NO: 800, SEQ ID NO: 806, SEQ ID NO: 812, SEQ ID NO: 818, SEQ ID NO: 824, SEQ ID NO: 830, SEQ ID NO: 836, SEQ ID NO: 842, SEQ ID NO: 848, SEQ ID NO: 854, SEQ ID NO: 860, SEQ ID NO: 866, SEQ ID NO: 872, SEQ ID NO: 878, SEQ ID NO: 884, SEQ ID NO: 890, SEQ ID NO: 896, SEQ ID NO: 902, SEQ ID NO: 908, SEQ ID NO: 914, SEQ ID NO: 920, SEQ ID NO: 926, SEQ ID NO: 932, SEQ ID NO: 938, SEQ ID NO: 944, SEQ ID NO: 950, SEQ ID NO: 956, SEQ ID NO: 962, SEQ ID NO: 968, SEQ ID NO: 974, SEQ ID NO: 980, SEQ ID NO: 986, SEQ ID NO: 992, SEQ ID NO: 998, SEQ ID NO: 1004, SEQ ID NO: 1010, SEQ ID NO: 1016, SEQ ID NO: 1022, SEQ ID NO: 1028, SEQ ID NO: 1034, SEQ ID NO: 1040, SEQ ID NO: 1046, SEQ ID NO: 1052, SEQ ID NO: 1058, SEQ ID NO: 1064, SEQ ID NO: 1070, SEQ ID NO: 1076, SEQ ID NO: 1082, SEQ ID NO: 1088, SEQ ID NO: 1094, SEQ ID NO: 1100, SEQ ID NO: 1106, SEQ ID NO: 1112, SEQ ID NO: 1118, SEQ ID NO: 1124, SEQ ID NO: 1130, SEQ ID NO: 1136, SEQ ID NO: 1142, SEQ ID NO: 1148, SEQ ID NO: 1154, SEQ ID NO: 1160, SEQ ID NO: 1166, SEQ ID NO: 1172, SEQ ID NO: 1178, SEQ ID NO: 1184, SEQ ID NO: 1190, SEQ ID NO: 1196, SEQ ID NO: 1202, SEQ ID NO: 1208, SEQ ID NO: 1214, SEQ ID NO: 1220, SEQ ID NO: 1226, SEQ ID NO: 1232, SEQ ID NO: 1238, SEQ ID NO: 1244, SEQ ID NO: 1250, SEQ ID NO: 1256, SEQ ID NO: 1262, SEQ ID NO: 1268, SEQ ID NO: 1274, SEQ ID NO: 1280, SEQ ID NO: 1286, SEQ ID NO: 1292, SEQ ID NO: 1298, SEQ ID NO: 1304, SEQ ID NO: 1310, SEQ ID NO: 1316, SEQ ID NO: 1322, SEQ ID NO: 1328, SEQ ID NO: 1334, SEQ ID NO: 1340, SEQ ID NO: 1346, SEQ ID NO: 1352, SEQ ID NO: 1358, SEQ ID NO: 1364, SEQ ID NO: 1370, SEQ ID NO: 1376, SEQ ID NO: 1382, SEQ ID NO: 1388, SEQ ID NO: 1394, SEQ ID NO: 1400, SEQ ID NO: 1406, SEQ ID NO: 1412, SEQ ID NO: 1418, SEQ ID NO: 1424, SEQ ID NO: 1430, SEQ ID NO: 1436, SEQ ID NO: 1442, SEQ ID NO: 1448, SEQ ID NO: 1454, SEQ ID NO: 1460, SEQ ID NO: 1466, SEQ ID NO: 1472, SEQ ID NO: 1478, SEQ ID NO: 1484, SEQ ID NO: 1490, SEQ ID

NO: 1496, SEQ ID NO: 1502, SEQ ID NO: 1508, SEQ ID NO: 1514, SEQ ID NO: 1520, SEQ ID NO: 1594, SEQ ID NO: 1526, SEQ ID NO: 1532, SEQ ID NO: 1538, SEQ ID NO: 1544, SEQ ID NO: 1550, SEQ ID NO: 1556, SEQ ID NO: 1562, SEQ ID NO: 1568, SEQ ID NO: 1574, SEQ ID NO: 1580, or SEQ ID NO: 1586 as shown in Figure 3A, 3B, or 3C, a heavy chain CDR3 comprising the amino acid sequence of any one of the HCDR3s in SEQ ID NO: 399, SEQ ID NO: 405, SEQ ID NO: 411, SEQ ID NO: 417, SEQ ID NO: 423, SEQ ID NO: 429, SEQ ID NO: 435, SEQ ID NO: 441, SEQ ID NO: 447, SEQ ID NO: 453, SEQ ID NO: 459, SEQ ID NO: 465, SEQ ID NO: 471, SEQ ID NO: 477, SEQ ID NO: 483, SEQ ID NO: 489, SEQ ID NO: 495, SEQ ID NO: 501, SEQ ID NO: 507, SEQ ID NO: 513, SEQ ID NO: 519, SEQ ID NO: 525, SEQ ID NO: 531, SEQ ID NO: 537, SEQ ID NO: 543, SEQ ID NO: 549, SEQ ID NO: 555, SEQ ID NO: 561, SEQ ID NO: 567, SEQ ID NO: 573, SEQ ID NO: 579, SEQ ID NO: 585, SEQ ID NO: 591, SEQ ID NO: 597, SEQ ID NO: 603, SEQ ID NO: 609, SEQ ID NO: 615, SEQ ID NO: 621, SEQ ID NO: 627, SEQ ID NO: 633, SEQ ID NO: 639, SEQ ID NO: 645, SEQ ID NO: 651, SEQ ID NO: 657, SEQ ID NO: 663, SEQ ID NO: 669, SEQ ID NO: 675, SEQ ID NO: 681, SEQ ID NO: 687, SEQ ID NO: 693, SEQ ID NO: 699, SEQ ID NO: 705, SEQ ID NO: 711, SEQ ID NO: 717, SEQ ID NO: 723, SEQ ID NO: 729, SEQ ID NO: 735, SEQ ID NO: 741, SEQ ID NO: 747, SEQ ID NO: 753, SEQ ID NO: 759, SEQ ID NO: 765, SEQ ID NO: 771, SEQ ID NO: 777, SEQ ID NO: 783, SEQ ID NO: 789, SEQ ID NO: 795, SEQ ID NO: 801, SEQ ID NO: 807, SEQ ID NO: 813, SEQ ID NO: 819, SEQ ID NO: 825, SEQ ID NO: 831, SEQ ID NO: 837, SEQ ID NO: 843, SEQ ID NO: 849, SEQ ID NO: 855, SEQ ID NO: 861, SEQ ID NO: 867, SEQ ID NO: 873, SEQ ID NO: 879, SEQ ID NO: 885, SEQ ID NO: 891, SEQ ID NO: 897, SEQ ID NO: 903, SEQ ID NO: 909, SEQ ID NO: 915, SEQ ID NO: 921, SEQ ID NO: 927, SEQ ID NO: 933, SEQ ID NO: 939, SEQ ID NO: 945, SEQ ID NO: 951, SEQ ID NO: 957, SEQ ID NO: 963, SEQ ID NO: 969, SEQ ID NO: 975, SEQ ID NO: 981, SEQ ID NO: 987, SEQ ID NO: 993, SEQ ID NO: 999, SEQ ID NO: 1005, SEQ ID NO: 1011, SEQ ID NO: 1017, SEQ ID NO: 1023, SEQ ID NO: 1029, SEQ ID NO: 1035, SEQ ID NO: 1041, SEQ ID NO: 1047, SEQ ID NO: 1053, SEQ ID NO: 1059, SEQ ID NO: 1065, SEQ ID NO: 1071, SEQ ID NO: 1077, SEQ ID NO: 1083, SEQ ID NO: 1089, SEQ ID NO: 1095, SEQ ID NO: 1101, SEQ ID NO: 1107, SEQ ID NO: 1113, SEQ ID NO: 1119, SEQ ID NO: 1125, SEQ ID NO: 1131, SEQ ID NO:

1137, SEQ ID NO: 1143, SEQ ID NO: 1149, SEQ ID NO: 1155, SEQ ID NO: 1161, SEQ ID NO: 1167, SEQ ID NO: 1173, SEQ ID NO: 1179, SEQ ID NO: 1185, SEQ ID NO: 1191, SEQ ID NO: 1197, SEQ ID NO: 1203, SEQ ID NO: 1209, SEQ ID NO: 1215, SEQ ID NO: 1221, SEQ ID NO: 1227, SEQ ID NO: 1233, SEQ ID NO: 1239, SEQ ID NO: 1245, SEQ ID NO: 1251, SEQ ID NO: 1257, SEQ ID NO: 1263, SEQ ID NO: 1269, SEQ ID NO: 1275, SEQ ID NO: 1281, SEQ ID NO: 1287, SEQ ID NO: 1293, SEQ ID NO: 1299, SEQ ID NO: 1305, SEQ ID NO: 1311, SEQ ID NO: 1317, SEQ ID NO: 1323, SEQ ID NO: 1329, SEQ ID NO: 1335, SEQ ID NO: 1341, SEQ ID NO: 1347, SEQ ID NO: 1353, SEQ ID NO: 1359, SEQ ID NO: 1365, SEQ ID NO: 1371, SEQ ID NO: 1377, SEQ ID NO: 1383, SEQ ID NO: 1389, SEQ ID NO: 1395, SEQ ID NO: 1401, SEQ ID NO: 1407, SEQ ID NO: 1413, SEQ ID NO: 1419, SEQ ID NO: 1425, SEQ ID NO: 1431, SEQ ID NO: 1437, SEQ ID NO: 1443, SEQ ID NO: 1449, SEQ ID NO: 1455, SEQ ID NO: 1461, SEQ ID NO: 1467, SEQ ID NO: 1473, SEQ ID NO: 1479, SEQ ID NO: 1485, SEQ ID NO: 1491, SEQ ID NO: 1497, SEQ ID NO: 1503, SEQ ID NO: 1509, SEQ ID NO: 1515, SEQ ID NO: 1521, SEQ ID NO: 1595, SEQ ID NO: 1527, SEQ ID NO: 1533, SEQ ID NO: 1539, SEQ ID NO: 1545, SEQ ID NO: 1551, SEQ ID NO: 1557, SEQ ID NO: 1563, SEQ ID NO: 1569, SEQ ID NO: 1575, SEQ ID NO: 1581, or SEQ ID NO: 1587 as shown in in Figure 3A, 3B, or 3C, a light chain CDR1 comprising the amino acid sequence of any one of the LCDR1s in SEQ ID NO: 400, SEQ ID NO: 406, SEQ ID NO: 412, SEQ ID NO: 418, SEQ ID NO: 424, SEQ ID NO: 430, SEQ ID NO: 436, SEQ ID NO: 442, SEQ ID NO: 448, SEQ ID NO: 454, SEQ ID NO: 460, SEQ ID NO: 466, SEQ ID NO: 472, SEQ ID NO: 478, SEQ ID NO: 484, SEQ ID NO: 490, SEQ ID NO: 496, SEQ ID NO: 502, SEQ ID NO: 508, SEQ ID NO: 514, SEQ ID NO: 520, SEQ ID NO: 526, SEQ ID NO: 532, SEQ ID NO: 538, SEQ ID NO: 544, SEQ ID NO: 550, SEQ ID NO: 556, SEQ ID NO: 562, SEQ ID NO: 568, SEQ ID NO: 574, SEQ ID NO: 580, SEQ ID NO: 586, SEQ ID NO: 592, SEQ ID NO: 598, SEQ ID NO: 604, SEQ ID NO: 610, SEQ ID NO: 616, SEQ ID NO: 622, SEQ ID NO: 628, SEQ ID NO: 634, SEQ ID NO: 640, SEQ ID NO: 646, SEQ ID NO: 652, SEQ ID NO: 658, SEQ ID NO: 664, SEQ ID NO: 670, SEQ ID NO: 676, SEQ ID NO: 682, SEQ ID NO: 688, SEQ ID NO: 694, SEQ ID NO: 700, SEQ ID NO: 706, SEQ ID NO: 712, SEQ ID NO: 718, SEQ ID NO: 724, SEQ ID NO: 730, SEQ ID NO: 736, SEQ ID NO: 742, SEQ ID NO: 748, SEQ ID NO: 754, SEQ ID NO: 760, SEQ ID

NO: 766, SEQ ID NO: 772, SEQ ID NO: 778, SEQ ID NO: 784, SEQ ID NO: 790, SEQ ID NO: 796, SEQ ID NO: 802, SEQ ID NO: 808, SEQ ID NO: 814, SEQ ID NO: 820, SEQ ID NO: 826, SEQ ID NO: 832, SEQ ID NO: 838, SEQ ID NO: 844, SEQ ID NO: 850, SEQ ID NO: 856, SEQ ID NO: 862, SEQ ID NO: 868, SEQ ID NO: 874, SEQ ID NO: 880, SEQ ID NO: 886, SEQ ID NO: 892, SEQ ID NO: 898, SEQ ID NO: 904, SEQ ID NO: 910, SEQ ID NO: 916, SEQ ID NO: 922, SEQ ID NO: 928, SEQ ID NO: 934, SEQ ID NO: 940, SEQ ID NO: 946, SEQ ID NO: 952, SEQ ID NO: 958, SEQ ID NO: 964, SEQ ID NO: 970, SEQ ID NO: 976, SEQ ID NO: 982, SEQ ID NO: 988, SEQ ID NO: 994, SEQ ID NO: 1000, SEQ ID NO: 1006, SEQ ID NO: 1012, SEQ ID NO: 1018, SEQ ID NO: 1024, SEQ ID NO: 1030, SEQ ID NO: 1036, SEQ ID NO: 1042, SEQ ID NO: 1048, SEQ ID NO: 1054, SEQ ID NO: 1060, SEQ ID NO: 1066, SEQ ID NO: 1072, SEQ ID NO: 1078, SEQ ID NO: 1084, SEQ ID NO: 1090, SEQ ID NO: 1096, SEQ ID NO: 1102, SEQ ID NO: 1108, SEQ ID NO: 1114, SEQ ID NO: 1120, SEQ ID NO: 1126, SEQ ID NO: 1132, SEQ ID NO: 1138, SEQ ID NO: 1144, SEQ ID NO: 1150, SEQ ID NO: 1156, SEQ ID NO: 1162, SEQ ID NO: 1168, SEQ ID NO: 1174, SEQ ID NO: 1180, SEQ ID NO: 1186, SEQ ID NO: 1192, SEQ ID NO: 1198, SEQ ID NO: 1204, SEQ ID NO: 1210, SEQ ID NO: 1216, SEQ ID NO: 1222, SEQ ID NO: 1228, SEQ ID NO: 1234, SEQ ID NO: 1240, SEQ ID NO: 1246, SEQ ID NO: 1252, SEQ ID NO: 1258, SEQ ID NO: 1264, SEQ ID NO: 1270, SEQ ID NO: 1276, SEQ ID NO: 1282, SEQ ID NO: 1288, SEQ ID NO: 1294, SEQ ID NO: 1300, SEQ ID NO: 1306, SEQ ID NO: 1312, SEQ ID NO: 1318, SEQ ID NO: 1324, SEQ ID NO: 1330, SEQ ID NO: 1336, SEQ ID NO: 1342, SEQ ID NO: 1348, SEQ ID NO: 1354, SEQ ID NO: 1360, SEQ ID NO: 1366, SEQ ID NO: 1372, SEQ ID NO: 1378, SEQ ID NO: 1384, SEQ ID NO: 1390, SEQ ID NO: 1396, SEQ ID NO: 1402, SEQ ID NO: 1408, SEQ ID NO: 1414, SEQ ID NO: 1420, SEQ ID NO: 1426, SEQ ID NO: 1432, SEQ ID NO: 1438, SEQ ID NO: 1444, SEQ ID NO: 1450. SEQ ID NO: 1456, SEQ ID NO: 1462, SEQ ID NO: 1468, SEQ ID NO: 1474, SEQ ID NO: 1480, SEQ ID NO: 1486, SEQ ID NO: 1492, SEQ ID NO: 1498, SEQ ID NO: 1504, SEQ ID NO: 1510, SEQ ID NO: 1516, SEQ ID NO: 1522, SEQ ID NO: 1596, SEQ ID NO: 1528, SEQ ID NO: 1534, SEQ ID NO: 1540, SEQ ID NO: 1546, SEQ ID NO: 1552, SEQ ID NO: 1558, SEQ ID NO: 1564, SEQ ID NO: 1570, SEQ ID NO: 1576, SEQ ID NO: 1582, or SEQ ID NO: 1588 as shown in Figure 3A, 3B, or 3C, a light chain CDR2 comprising the amino

acid sequence of any one of the LCDR2s in SEQ ID NO: 401, SEQ ID NO: 407, SEQ ID NO: 413, SEQ ID NO: 419, SEQ ID NO: 425, SEQ ID NO: 431, SEQ ID NO: 437, SEQ ID NO: 443, SEQ ID NO: 449, SEQ ID NO: 455, SEQ ID NO: 461, SEQ ID NO: 467, SEQ ID NO: 473, SEQ ID NO: 479, SEQ ID NO: 485, SEQ ID NO: 491, SEQ ID NO: 497, SEQ ID NO: 503, SEQ ID NO: 509, SEQ ID NO: 515, SEQ ID NO: 521, SEQ ID NO: 527, SEQ ID NO: 533, SEQ ID NO: 539, SEQ ID NO: 545, SEQ ID NO: 551, SEQ ID NO: 557, SEQ ID NO: 563, SEQ ID NO: 569, SEQ ID NO: 575, SEQ ID NO: 581, SEQ ID NO: 587, SEQ ID NO: 593, SEQ ID NO: 599, SEQ ID NO: 605, SEQ ID NO: 611, SEQ ID NO: 617, SEQ ID NO: 623, SEQ ID NO: 629, SEQ ID NO: 635, SEQ ID NO: 641, SEQ ID NO: 647, SEQ ID NO: 653, SEQ ID NO: 659, SEQ ID NO: 665, SEQ ID NO: 671, SEQ ID NO: 677, SEQ ID NO: 683, SEQ ID NO: 689, SEQ ID NO: 695, SEQ ID NO: 701, SEQ ID NO: 707, SEQ ID NO: 713, SEQ ID NO: 719, SEQ ID NO: 725, SEQ ID NO: 731, SEQ ID NO: 737, SEQ ID NO: 743, SEQ ID NO: 749, SEQ ID NO: 755, SEQ ID NO: 761, SEQ ID NO: 767, SEQ ID NO: 773, SEQ ID NO: 779, SEQ ID NO: 785, SEQ ID NO: 791, SEQ ID NO: 797, SEQ ID NO: 803, SEQ ID NO: 809, SEQ ID NO: 815, SEQ ID NO: 821, SEQ ID NO: 827, SEQ ID NO: 833, SEQ ID NO: 839, SEQ ID NO: 845, SEQ ID NO: 851, SEQ ID NO: 857, SEQ ID NO: 863, SEQ ID NO: 869, SEQ ID NO: 875, SEQ ID NO: 881, SEQ ID NO: 887, SEQ ID NO: 893, SEQ ID NO: 899, SEQ ID NO: 905, SEQ ID NO: 911, SEQ ID NO: 917, SEQ ID NO: 923, SEQ ID NO: 929, SEQ ID NO: 935, SEQ ID NO: 941, SEQ ID NO: 947, SEQ ID NO: 953, SEQ ID NO: 959, SEQ ID NO: 965, SEQ ID NO: 971, SEQ ID NO: 977, SEQ ID NO: 983, SEQ ID NO: 989, SEQ ID NO: 995, SEQ ID NO: 1001, SEQ ID NO: 1007, SEQ ID NO: 1013, SEQ ID NO: 1019, SEQ ID NO: 1025, SEQ ID NO: 1031, SEQ ID NO: 1037, SEQ ID NO: 1043, SEQ ID NO: 1049, SEQ ID NO: 1055, SEQ ID NO: 1061, SEQ ID NO: 1067, SEQ ID NO: 1073, SEQ ID NO: 1079, SEQ ID NO: 1085, SEQ ID NO: 1091, SEQ ID NO: 1097, SEQ ID NO: 1103, SEQ ID NO: 1109, SEQ ID NO: 1115, SEQ ID NO: 1121, SEQ ID NO: 1127, SEQ ID NO: 1133, SEQ ID NO: 1139, SEQ ID NO: 1145, SEQ ID NO: 1151, SEQ ID NO: 1157, SEQ ID NO: 1163, SEQ ID NO: 1169, SEQ ID NO: 1175, SEQ ID NO: 1181, SEQ ID NO: 1187, SEQ ID NO: 1193, SEQ ID NO: 1199, SEQ ID NO: 1205, SEQ ID NO: 1211, SEQ ID NO: 1217, SEQ ID NO: 1223, SEQ ID NO: 1229, SEQ ID NO: 1235, SEQ ID NO: 1241, SEQ ID NO: 1247, SEQ ID NO: 1253, SEQ ID NO: 1259, SEQ ID

NO: 1265, SEQ ID NO: 1271, SEQ ID NO: 1277, SEQ ID NO: 1283, SEQ ID NO: 1289, SEQ ID NO: 1295, SEQ ID NO: 1301, SEQ ID NO: 1307, SEQ ID NO: 1313, SEQ ID NO: 1319, SEQ ID NO: 1325, SEQ ID NO: 1331, SEQ ID NO: 1337, SEQ ID NO: 1343, SEQ ID NO: 1349, SEQ ID NO: 1355, SEQ ID NO: 1361, SEQ ID NO: 1367, SEQ ID NO: 1373, SEQ ID NO: 1379, SEQ ID NO: 1385, SEQ ID NO: 1391, SEQ ID NO: 1397, SEQ ID NO: 1403, SEQ ID NO: 1409, SEQ ID NO: 1415, SEQ ID NO: 1421, SEQ ID NO: 1427, SEQ ID NO: 1433, SEQ ID NO: 1439, SEQ ID NO: 1445, SEQ ID NO: 1451, SEQ ID NO: 1457, SEQ ID NO: 1463, SEQ ID NO: 1469, SEQ ID NO: 1475, SEQ ID NO: 1481, SEQ ID NO: 1487, SEQ ID NO: 1493, SEQ ID NO: 1499, SEQ ID NO: 1505, SEQ ID NO: 1511, SEQ ID NO: 1517, SEQ ID NO: 1523, SEQ ID NO: 1597, SEQ ID NO: 1529, SEQ ID NO: 1535, SEQ ID NO: 1541, SEQ ID NO: 1547, SEQ ID NO: 1553, SEQ ID NO: 1559, SEQ ID NO: 1565, SEQ ID NO: 1571, SEQ ID NO: 1577, SEQ ID NO: 1583, or SEQ ID NO: 1589 as shown in Figure 3A, 3B, or 3C, and a light chain CDR3 comprising the amino acid sequence of any one of the LCDR3s in SEQ ID NO: 402, SEQ ID NO: 408, SEQ ID NO: 414, SEQ ID NO: 420, SEQ ID NO: 426, SEQ ID NO: 432, SEQ ID NO: 438, SEQ ID NO: 444, SEQ ID NO: 450, SEQ ID NO: 456, SEQ ID NO: 462, SEQ ID NO: 468, SEQ ID NO: 474, SEQ ID NO: 480, SEQ ID NO: 486, SEQ ID NO: 492, SEQ ID NO: 498, SEQ ID NO: 504, SEQ ID NO: 510, SEQ ID NO: 516, SEQ ID NO: 522, SEQ ID NO: 528, SEQ ID NO: 534, SEQ ID NO: 540, SEQ ID NO: 546, SEQ ID NO: 552, SEQ ID NO: 558, SEQ ID NO: 564, SEQ ID NO: 570, SEQ ID NO: 576, SEQ ID NO: 582, SEQ ID NO: 588, SEQ ID NO: 594, SEQ ID NO: 600, SEQ ID NO: 606, SEQ ID NO: 612, SEQ ID NO: 618, SEQ ID NO: 624, SEQ ID NO: 630, SEQ ID NO: 636, SEQ ID NO: 642, SEQ ID NO: 648, SEQ ID NO: 654, SEQ ID NO: 660, SEQ ID NO: 666, SEQ ID NO: 672, SEQ ID NO: 678, SEQ ID NO: 684, SEQ ID NO: 690, SEQ ID NO: 696, SEQ ID NO: 702, SEQ ID NO: 708, SEQ ID NO: 714, SEQ ID NO: 720, SEQ ID NO: 726, SEQ ID NO: 732, SEQ ID NO: 738, SEQ ID NO: 744, SEQ ID NO: 750, SEQ ID NO: 756, SEQ ID NO: 762, SEQ ID NO: 768, SEQ ID NO: 774, SEQ ID NO: 780, SEQ ID NO: 786, SEQ ID NO: 792, SEQ ID NO: 798, SEQ ID NO: 804, SEQ ID NO: 810, SEQ ID NO: 816, SEQ ID NO: 822, SEQ ID NO: 828, SEQ ID NO: 834, SEQ ID NO: 840, SEQ ID NO: 846, SEQ ID NO: 852, SEQ ID NO: 858, SEQ ID NO: 864, SEQ ID NO: 870, SEQ ID NO: 876, SEQ ID NO: 882, SEQ ID NO: 888, SEQ ID NO: 894, SEQ ID

NO: 900, SEQ ID NO: 906, SEQ ID NO: 912, SEQ ID NO: 918, SEQ ID NO: 924, SEQ ID NO: 930, SEQ ID NO: 936, SEQ ID NO: 942, SEQ ID NO: 948, SEQ ID NO: 954, SEQ ID NO: 960, SEQ ID NO: 966, SEQ ID NO: 972, SEQ ID NO: 978, SEQ ID NO: 984, SEQ ID NO: 990, SEQ ID NO: 996, SEQ ID NO: 1002, SEQ ID NO: 1008, SEQ ID NO: 1014, SEQ ID NO: 1020, SEQ ID NO: 1026, SEQ ID NO: 1032, SEQ ID NO: 1038, SEQ ID NO: 1044, SEQ ID NO: 1050, SEQ ID NO: 1056, SEQ ID NO: 1062, SEQ ID NO: 1068, SEQ ID NO: 1074, SEQ ID NO: 1080, SEQ ID NO: 1086, SEQ ID NO: 1092, SEQ ID NO: 1098, SEQ ID NO: 1104, SEQ ID NO: 1110, SEQ ID NO: 1116, SEQ ID NO: 1122, SEQ ID NO: 1128, SEQ ID NO: 1134, SEQ ID NO: 1140, SEQ ID NO: 1146, SEQ ID NO: 1152, SEQ ID NO: 1158, SEQ ID NO: 1164, SEQ ID NO: 1170, SEQ ID NO: 1176, SEQ ID NO: 1182, SEQ ID NO: 1188, SEQ ID NO: 1194, SEQ ID NO: 1200, SEQ ID NO: 1206, SEQ ID NO: 1212, SEQ ID NO: 1218, SEQ ID NO: 1224, SEQ ID NO: 1230, SEQ ID NO: 1236, SEQ ID NO: 1242, SEQ ID NO: 1248, SEQ ID NO: 1254, SEQ ID NO: 1260, SEQ ID NO: 1266, SEQ ID NO: 1272, SEQ ID NO: 1278, SEQ ID NO: 1284, SEQ ID NO: 1290, SEQ ID NO: 1296, SEQ ID NO: 1302, SEQ ID NO: 1308, SEQ ID NO: 1314, SEQ ID NO: 1320, SEQ ID NO: 1326, SEQ ID NO: 1332, SEQ ID NO: 1338, SEQ ID NO: 1344, SEQ ID NO: 1350, SEQ ID NO: 1356, SEQ ID NO: 1362, SEQ ID NO: 1368, SEQ ID NO: 1374, SEQ ID NO: 1380, SEQ ID NO: 1386, SEQ ID NO: 1392, SEQ ID NO: 1398, SEQ ID NO: 1404, SEQ ID NO: 1410, SEQ ID NO: 1416, SEQ ID NO: 1422, SEQ ID NO: 1428, SEQ ID NO: 1434, SEQ ID NO: 1440, SEQ ID NO: 1446, SEQ ID NO: 1452, SEQ ID NO: 1458, SEQ ID NO: 1464, SEQ ID NO: 1470, SEQ ID NO: 1476, SEQ ID NO: 1482, SEQ ID NO: 1488, SEQ ID NO: 1494, SEQ ID NO: 1500, SEQ ID NO: 1506, SEQ ID NO: 1512, SEQ ID NO: 1518, SEQ ID NO: 1524, SEQ ID NO: 1598, SEQ ID NO: 1530, SEQ ID NO: 1536, SEQ ID NO: 1542, SEQ ID NO: 1548, SEQ ID NO: 1554, SEQ ID NO: 1560, SEQ ID NO: 1566, SEQ ID NO: 1572, SEQ ID NO: 1578, SEQ ID NO: 1584, or SEQ ID NO: 1590 as shown in Figure 3A, 3B, or 3C, and the HCDR1, HCDR2, HCDR3, LCDR1, LCDR2, and LCDR3 are from a same clone.

[0200] In some embodiments, an isolated antigen binding molecule that binds to human TIGIT comprises a heavy chain comprising the heavy chain amino acid variable

sequence in any one of SEQ ID NO. 1 – SEQ ID NO: 97, SEQ ID NO: 195 – SEQ ID NO: 209, or SEQ ID NO: 225 – SEQ ID NO: 310 as shown in Figures 2A, 2B, or 2C.

[0201] In some embodiments, an isolated antigen binding molecule that binds to human TIGIT comprises a light chain comprising the light chain amino acid variable sequence in any one of SEQ ID NO: 98 – SEQ ID NO: 194, SEQ ID NO: 210 – SEQ ID NO: 224, or SEQ ID NO: 311 – SEQ ID NO: 396 as shown in Figures 2A, 2B, or 2C.

[0202] In some embodiments, an isolated antigen binding molecule that binds to human TIGIT comprises a heavy chain comprising the heavy chain amino acid variable sequence in any one of SEQ ID NO. 1 – SEQ ID NO: 97, SEQ ID NO: 195 – SEQ ID NO: 209, or SEQ ID NO: 225 – SEQ ID NO: 310 as shown in Figures 2A, 2B, or 2C and a light chain comprising the light chain amino acid variable sequence in any one of SEQ ID NO: 98 – SEQ ID NO: 194, SEQ ID NO: 210 – SEQ ID NO: 224, or SEQ ID NO: 311 – SEQ ID NO: 396 as shown in Figures 2A, 2B, or 2C.

[0203] In some embodiments, an isolated antibody comprises a heavy chain CDR1 comprising the amino acid sequence of any of one of the HCDR1s in SEQ ID NO: 397, SEQ ID NO: 403. SEQ ID NO: 409, SEQ ID NO: 415, SEQ ID NO: 421, SEQ ID NO: 427, SEQ ID NO: 433, SEQ ID NO: 439, SEQ ID NO: 445, SEQ ID NO: 451, SEQ ID NO: 457, SEQ ID NO: 463, SEQ ID NO: 469, SEQ ID NO: 475, SEQ ID NO: 481, SEQ ID NO: 487, SEQ ID NO: 493, SEQ ID NO: 499, SEQ ID NO: 505, SEQ ID NO: 511, SEQ ID NO: 517, SEQ ID NO: 523, SEQ ID NO: 529, SEQ ID NO: 535, SEQ ID NO: 541, SEQ ID NO: 547, SEQ ID NO: 553, SEQ ID NO: 559, SEQ ID NO: 565, SEQ ID NO: 571, SEQ ID NO: 577, SEQ ID NO: 583, SEQ ID NO: 589, SEQ ID NO: 595, SEQ ID NO: 601, SEQ ID NO: 607, SEQ ID NO: 613, SEQ ID NO: 619, SEQ ID NO: 625, SEQ ID NO: 631, SEQ ID NO: 637, SEQ ID NO: 643, SEQ ID NO: 649, SEQ ID NO: 655, SEQ ID NO: 661, SEQ ID NO: 667, SEQ ID NO: 673, SEQ ID NO: 679, SEQ ID NO: 685, SEQ ID NO: 691, SEQ ID NO: 697, SEQ ID NO: 703, SEQ ID NO: 709, SEQ ID NO: 715, SEQ ID NO: 721, SEQ ID NO: 727, SEQ ID NO: 733, SEQ ID NO: 739, SEQ ID NO: 745, SEQ ID NO: 751, SEQ ID NO: 757, SEQ ID NO: 763, SEQ ID NO: 769, SEQ ID NO: 775, SEQ ID NO: 781, SEQ ID NO: 787, SEQ ID NO: 793, SEQ ID NO: 799, SEQ ID NO: 805, SEQ ID NO: 811, SEQ ID NO: 817, SEQ ID NO: 823, SEQ ID NO: 829, SEQ ID NO: 835, SEQ ID NO: 841, SEQ ID NO:

847, SEQ ID NO: 853, SEQ ID NO: 859, SEQ ID NO: 865, SEQ ID NO: 871, SEQ ID NO: 877, SEQ ID NO: 883, SEQ ID NO: 889, SEQ ID NO: 895, SEQ ID NO: 901, SEQ ID NO: 907, SEQ ID NO: 913, SEQ ID NO: 919, SEQ ID NO: 925, SEQ ID NO: 931, SEQ ID NO: 937, SEQ ID NO: 943, SEQ ID NO: 949, SEQ ID NO: 955, SEQ ID NO: 961, SEQ ID NO: 967, SEQ ID NO: 973, SEQ ID NO: 979, SEQ ID NO: 985, SEQ ID NO: 991, SEQ ID NO: 997, SEQ ID NO: 1003, SEQ ID NO: 1009, SEQ ID NO: 1015, SEQ ID NO: 1021, SEQ ID NO: 1027, SEQ ID NO: 1033, SEQ ID NO: 1039, SEQ ID NO: 1045, SEQ ID NO: 1051, SEQ ID NO: 1057, SEQ ID NO: 1063, SEQ ID NO: 1069, SEQ ID NO: 1075, SEQ ID NO: 1081, SEQ ID NO: 1087, SEQ ID NO: 1093, SEQ ID NO: 1099, SEQ ID NO: 1105, SEQ ID NO: 1111, SEQ ID NO: 1117, SEQ ID NO: 1123, SEQ ID NO: 1129, SEQ ID NO: 1135, SEQ ID NO: 1141, SEQ ID NO: 1147, SEQ ID NO: 1153, SEQ ID NO: 1159, SEQ ID NO: 1165, SEQ ID NO: 1171, SEQ ID NO: 1177, SEQ ID NO: 1183, SEQ ID NO: 1189, SEQ ID NO: 1195, SEQ ID NO: 1201, SEQ ID NO: 1207, SEQ ID NO: 1213, SEQ ID NO: 1219, SEQ ID NO: 1225, SEQ ID NO: 1231, SEQ ID NO: 1237, SEQ ID NO: 1243, SEQ ID NO: 1249, SEQ ID NO: 1255, SEQ ID NO: 1261, SEQ ID NO: 1267, SEQ ID NO: 1273, SEQ ID NO: 1279, SEQ ID NO: 1285, SEQ ID NO: 1291, SEQ ID NO: 1297, SEQ ID NO: 1303, SEQ ID NO: 1309, SEQ ID NO: 1315, SEQ ID NO: 1321, SEQ ID NO: 1327, SEQ ID NO: 1333, SEQ ID NO: 1339, SEQ ID NO: 1345, SEQ ID NO: 1351, SEQ ID NO: 1357, SEQ ID NO: 1363, SEQ ID NO: 1369, SEQ ID NO: 1375, SEQ ID NO: 1381, SEQ ID NO: 1387, SEQ ID NO: 1393, SEQ ID NO: 1399, SEQ ID NO: 1405, SEQ ID NO: 1411, SEQ ID NO: 1417, SEQ ID NO: 1423, SEQ ID NO: 1429, SEQ ID NO: 1435, SEQ ID NO: 1441, SEQ ID NO: 1447, SEQ ID NO: 1453, SEQ ID NO: 1459, SEQ ID NO: 1465, SEQ ID NO: 1471, SEQ ID NO: 1477, SEQ ID NO: 1483, SEQ ID NO: 1489, SEQ ID NO: 1495, SEQ ID NO: 1501, SEQ ID NO: 1507, SEQ ID NO: 1513, SEQ ID NO: 1519, SEQ ID NO: 1593, SEQ ID NO: 1525 SEQ ID NO: 1531, SEQ ID NO: 1537, SEQ ID NO: 1543, SEQ ID NO: 1549, SEQ ID NO: 1555, SEQ ID NO: 1561, SEQ ID NO: 1567, SEQ ID NO: 1573, SEQ ID NO: 1579, or SEQ ID NO: 1585 as shown in Figure 3A, 3B, or 3C, a heavy chain CDR2 comprising the amino acid sequence of any one of the HCDR2s in SEQ ID NO: 398, SEQ ID NO: 404, SEQ ID NO: 410, SEQ ID NO: 416, SEQ ID NO: 422, SEQ ID NO: 428, SEQ ID NO: 434, SEQ ID NO: 440, SEQ ID NO: 446, SEQ ID NO: 452, SEQ ID NO: 458, SEQ ID

NO: 464, SEQ ID NO: 470, SEQ ID NO: 476, SEQ ID NO: 482, SEQ ID NO: 488, SEQ ID NO: 494, SEQ ID NO: 500, SEQ ID NO: 506, SEQ ID NO: 512, SEQ ID NO: 518, SEQ ID NO: 524, SEQ ID NO: 530, SEQ ID NO: 536, SEQ ID NO: 542, SEQ ID NO: 548, SEQ ID NO: 554, SEQ ID NO: 560, SEQ ID NO: 566, SEQ ID NO: 572, SEQ ID NO: 578, SEQ ID NO: 584, SEQ ID NO: 590, SEQ ID NO: 596, SEQ ID NO: 602, SEQ ID NO: 608, SEQ ID NO: 614, SEQ ID NO: 620, SEQ ID NO: 626, SEQ ID NO: 632, SEQ ID NO: 638, SEQ ID NO: 644, SEQ ID NO: 650, SEQ ID NO: 656, SEQ ID NO: 662, SEQ ID NO: 668, SEQ ID NO: 674, SEQ ID NO: 680, SEQ ID NO: 686, SEQ ID NO: 692, SEQ ID NO: 698, SEQ ID NO: 704, SEQ ID NO: 710, SEQ ID NO: 716, SEQ ID NO: 722, SEQ ID NO: 728, SEQ ID NO: 734, SEQ ID NO: 740, SEQ ID NO: 746, SEQ ID NO: 752, SEQ ID NO: 758, SEQ ID NO: 764, SEQ ID NO: 770, SEQ ID NO: 776, SEQ ID NO: 782, SEQ ID NO: 788, SEQ ID NO: 794, SEQ ID NO: 800, SEQ ID NO: 806, SEQ ID NO: 812, SEQ ID NO: 818, SEQ ID NO: 824, SEQ ID NO: 830, SEQ ID NO: 836, SEQ ID NO: 842, SEQ ID NO: 848, SEQ ID NO: 854, SEQ ID NO: 860, SEQ ID NO: 866, SEQ ID NO: 872, SEQ ID NO: 878, SEQ ID NO: 884, SEQ ID NO: 890, SEQ ID NO: 896, SEQ ID NO: 902, SEQ ID NO: 908, SEQ ID NO: 914, SEQ ID NO: 920, SEQ ID NO: 926, SEQ ID NO: 932, SEQ ID NO: 938, SEQ ID NO: 944, SEQ ID NO: 950, SEQ ID NO: 956, SEQ ID NO: 962, SEQ ID NO: 968, SEQ ID NO: 974, SEQ ID NO: 980, SEQ ID NO: 986, SEQ ID NO: 992, SEQ ID NO: 998, SEQ ID NO: 1004, SEQ ID NO: 1010, SEQ ID NO: 1016, SEQ ID NO: 1022, SEQ ID NO: 1028, SEQ ID NO: 1034, SEQ ID NO: 1040, SEQ ID NO: 1046, SEQ ID NO: 1052, SEQ ID NO: 1058, SEQ ID NO: 1064, SEQ ID NO: 1070, SEQ ID NO: 1076, SEQ ID NO: 1082, SEQ ID NO: 1088, SEQ ID NO: 1094, SEQ ID NO: 1100, SEQ ID NO: 1106, SEQ ID NO: 1112, SEQ ID NO: 1118, SEQ ID NO: 1124, SEQ ID NO: 1130, SEQ ID NO: 1136, SEQ ID NO: 1142, SEQ ID NO: 1148, SEQ ID NO: 1154, SEQ ID NO: 1160, SEQ ID NO: 1166, SEQ ID NO: 1172, SEQ ID NO: 1178, SEQ ID NO: 1184, SEQ ID NO: 1190, SEQ ID NO: 1196, SEQ ID NO: 1202, SEQ ID NO: 1208, SEQ ID NO: 1214, SEQ ID NO: 1220, SEQ ID NO: 1226, SEQ ID NO: 1232, SEQ ID NO: 1238, SEQ ID NO: 1244, SEQ ID NO: 1250, SEQ ID NO: 1256, SEQ ID NO: 1262, SEQ ID NO: 1268, SEQ ID NO: 1274, SEQ ID NO: 1280, SEQ ID NO: 1286, SEQ ID NO: 1292, SEQ ID NO: 1298, SEQ ID NO: 1304, SEQ ID NO: 1310, SEQ ID NO: 1316, SEQ ID NO: 1322, SEQ ID NO: 1328, SEQ ID NO: 1334, SEQ ID

NO: 1340, SEQ ID NO: 1346, SEQ ID NO: 1352, SEQ ID NO: 1358, SEQ ID NO: 1364, SEQ ID NO: 1370, SEQ ID NO: 1376, SEQ ID NO: 1382, SEQ ID NO: 1388, SEQ ID NO: 1394, SEQ ID NO: 1400, SEQ ID NO: 1406, SEQ ID NO: 1412, SEQ ID NO: 1418, SEQ ID NO: 1424, SEQ ID NO: 1430, SEQ ID NO: 1436, SEQ ID NO: 1442, SEQ ID NO: 1448, SEQ ID NO: 1454, SEQ ID NO: 1460, SEQ ID NO: 1466, SEQ ID NO: 1472, SEQ ID NO: 1478, SEQ ID NO: 1484, SEQ ID NO: 1490, SEQ ID NO: 1496, SEQ ID NO: 1502, SEQ ID NO: 1508, SEQ ID NO: 1514, SEQ ID NO: 1520, SEQ ID NO: 1594, SEQ ID NO: 1526, SEQ ID NO: 1532, SEQ ID NO: 1538, SEQ ID NO: 1544, SEQ ID NO: 1550, SEQ ID NO: 1556, SEQ ID NO: 1562, SEQ ID NO: 1568, SEQ ID NO: 1574, SEQ ID NO: 1580, or SEQ ID NO: 1586 as shown in Figure 3A, 3B, or 3C, a heavy chain CDR3 comprising the amino acid sequence of any one of the HCDR3s in SEQ ID NO: 399, SEQ ID NO: 405, SEQ ID NO: 411, SEQ ID NO: 417, SEQ ID NO: 423, SEQ ID NO: 429, SEQ ID NO: 435, SEQ ID NO: 441, SEQ ID NO: 447, SEQ ID NO: 453, SEQ ID NO: 459, SEQ ID NO: 465, SEQ ID NO: 471, SEQ ID NO: 477, SEQ ID NO: 483, SEQ ID NO: 489, SEQ ID NO: 495, SEQ ID NO: 501, SEQ ID NO: 507, SEQ ID NO: 513, SEQ ID NO: 519, SEQ ID NO: 525, SEQ ID NO: 531, SEQ ID NO: 537, SEQ ID NO: 543, SEQ ID NO: 549, SEQ ID NO: 555, SEQ ID NO: 561, SEQ ID NO: 567, SEQ ID NO: 573, SEQ ID NO: 579, SEQ ID NO: 585, SEQ ID NO: 591, SEQ ID NO: 597, SEQ ID NO: 603, SEQ ID NO: 609, SEQ ID NO: 615, SEQ ID NO: 621, SEQ ID NO: 627, SEQ ID NO: 633, SEQ ID NO: 639, SEQ ID NO: 645, SEQ ID NO: 651, SEQ ID NO: 657, SEQ ID NO: 663, SEQ ID NO: 669, SEQ ID NO: 675, SEQ ID NO: 681, SEQ ID NO: 687, SEQ ID NO: 693, SEQ ID NO: 699, SEQ ID NO: 705, SEQ ID NO: 711, SEQ ID NO: 717, SEQ ID NO: 723, SEQ ID NO: 729, SEQ ID NO: 735, SEQ ID NO: 741, SEQ ID NO: 747, SEQ ID NO: 753, SEQ ID NO: 759, SEQ ID NO: 765, SEQ ID NO: 771, SEQ ID NO: 777, SEQ ID NO: 783, SEQ ID NO: 789, SEQ ID NO: 795, SEQ ID NO: 801, SEQ ID NO: 807, SEQ ID NO: 813, SEQ ID NO: 819, SEQ ID NO: 825, SEQ ID NO: 831, SEQ ID NO: 837, SEQ ID NO: 843, SEQ ID NO: 849, SEQ ID NO: 855, SEQ ID NO: 861, SEQ ID NO: 867, SEQ ID NO: 873, SEQ ID NO: 879, SEQ ID NO: 885, SEQ ID NO: 891, SEQ ID NO: 897, SEQ ID NO: 903, SEQ ID NO: 909, SEQ ID NO: 915, SEQ ID NO: 921, SEQ ID NO: 927, SEQ ID NO: 933, SEQ ID NO: 939, SEQ ID NO: 945, SEQ ID NO: 951, SEQ ID NO: 957, SEQ ID NO: 963, SEQ ID NO: 969, SEQ ID NO: 975, SEQ ID

NO: 981, SEQ ID NO: 987, SEQ ID NO: 993, SEQ ID NO: 999, SEQ ID NO: 1005, SEQ ID NO: 1011, SEQ ID NO: 1017, SEQ ID NO: 1023, SEQ ID NO: 1029, SEQ ID NO: 1035, SEQ ID NO: 1041, SEQ ID NO: 1047, SEQ ID NO: 1053, SEQ ID NO: 1059, SEQ ID NO: 1065, SEQ ID NO: 1071, SEQ ID NO: 1077, SEQ ID NO: 1083, SEQ ID NO: 1089, SEQ ID NO: 1095, SEQ ID NO: 1101, SEQ ID NO: 1107, SEQ ID NO: 1113, SEQ ID NO: 1119, SEQ ID NO: 1125, SEQ ID NO: 1131, SEQ ID NO: 1137, SEQ ID NO: 1143, SEQ ID NO: 1149, SEQ ID NO: 1155, SEQ ID NO: 1161, SEQ ID NO: 1167, SEQ ID NO: 1173, SEQ ID NO: 1179, SEQ ID NO: 1185, SEQ ID NO: 1191, SEQ ID NO: 1197, SEQ ID NO: 1203, SEQ ID NO: 1209, SEQ ID NO: 1215, SEQ ID NO: 1221, SEQ ID NO: 1227, SEQ ID NO: 1233, SEQ ID NO: 1239, SEQ ID NO: 1245, SEQ ID NO: 1251, SEQ ID NO: 1257, SEQ ID NO: 1263, SEQ ID NO: 1269, SEQ ID NO: 1275, SEQ ID NO: 1281, SEQ ID NO: 1287, SEQ ID NO: 1293, SEQ ID NO: 1299, SEQ ID NO: 1305, SEQ ID NO: 1311, SEQ ID NO: 1317, SEQ ID NO: 1323, SEQ ID NO: 1329, SEQ ID NO: 1335, SEQ ID NO: 1341, SEQ ID NO: 1347, SEQ ID NO: 1353, SEQ ID NO: 1359, SEQ ID NO: 1365, SEQ ID NO: 1371, SEQ ID NO: 1377, SEQ ID NO: 1383, SEQ ID NO: 1389, SEQ ID NO: 1395, SEQ ID NO: 1401, SEQ ID NO: 1407, SEQ ID NO: 1413, SEQ ID NO: 1419, SEQ ID NO: 1425, SEQ ID NO: 1431, SEQ ID NO: 1437, SEQ ID NO: 1443, SEQ ID NO: 1449, SEQ ID NO: 1455, SEQ ID NO: 1461, SEQ ID NO: 1467, SEQ ID NO: 1473, SEQ ID NO: 1479, SEQ ID NO: 1485, SEQ ID NO: 1491, SEQ ID NO: 1497, SEQ ID NO: 1503, SEQ ID NO: 1509, SEQ ID NO: 1515, SEQ ID NO: 1521, SEQ ID NO: 1595, SEQ ID NO: 1527, SEQ ID NO: 1533, SEQ ID NO: 1539, SEQ ID NO: 1545, SEQ ID NO: 1551, SEQ ID NO: 1557, SEQ ID NO: 1563, SEQ ID NO: 1569, SEQ ID NO: 1575, SEQ ID NO: 1581, or SEQ ID NO: 1587 as shown in Figure 3A, 3B, or 3C, a light chain CDR1 comprising the amino acid sequence of any one of the LCDR1s in SEQ ID NO: 400, SEQ ID NO: 406, SEQ ID NO: 412, SEQ ID NO: 418, SEQ ID NO: 424, SEQ ID NO: 430, SEQ ID NO: 436, SEQ ID NO: 442, SEQ ID NO: 448, SEQ ID NO: 454, SEQ ID NO: 460, SEQ ID NO: 466, SEQ ID NO: 472, SEQ ID NO: 478, SEQ ID NO: 484, SEQ ID NO: 490, SEQ ID NO: 496, SEQ ID NO: 502, SEQ ID NO: 508, SEQ ID NO: 514, SEQ ID NO: 520, SEQ ID NO: 526, SEQ ID NO: 532, SEQ ID NO: 538, SEQ ID NO: 544, SEQ ID NO: 550, SEQ ID NO: 556, SEQ ID NO: 562, SEQ ID NO: 568, SEQ ID NO: 574, SEQ ID NO: 580, SEQ ID NO: 586, SEQ ID NO: 592, SEQ ID

NO: 598, SEQ ID NO: 604, SEQ ID NO: 610, SEQ ID NO: 616, SEQ ID NO: 622, SEQ ID NO: 628, SEQ ID NO: 634, SEQ ID NO: 640, SEQ ID NO: 646, SEQ ID NO: 652, SEQ ID NO: 658, SEQ ID NO: 664, SEQ ID NO: 670, SEQ ID NO: 676, SEQ ID NO: 682, SEQ ID NO: 688, SEQ ID NO: 694, SEQ ID NO: 700, SEQ ID NO: 706, SEQ ID NO: 712, SEQ ID NO: 718, SEQ ID NO: 724, SEQ ID NO: 730, SEQ ID NO: 736, SEQ ID NO: 742, SEQ ID NO: 748, SEQ ID NO: 754, SEQ ID NO: 760, SEQ ID NO: 766, SEQ ID NO: 772, SEQ ID NO: 778, SEQ ID NO: 784, SEQ ID NO: 790, SEQ ID NO: 796, SEQ ID NO: 802, SEQ ID NO: 808, SEQ ID NO: 814, SEQ ID NO: 820, SEQ ID NO: 826, SEQ ID NO: 832, SEQ ID NO: 838, SEQ ID NO: 844, SEQ ID NO: 850, SEQ ID NO: 856, SEQ ID NO: 862, SEQ ID NO: 868, SEQ ID NO: 874, SEQ ID NO: 880, SEQ ID NO: 886, SEQ ID NO: 892, SEQ ID NO: 898, SEQ ID NO: 904, SEQ ID NO: 910, SEQ ID NO: 916, SEQ ID NO: 922, SEQ ID NO: 928, SEQ ID NO: 934, SEQ ID NO: 940, SEQ ID NO: 946, SEQ ID NO: 952, SEQ ID NO: 958, SEQ ID NO: 964, SEQ ID NO: 970, SEQ ID NO: 976, SEQ ID NO: 982, SEQ ID NO: 988, SEQ ID NO: 994, SEQ ID NO: 1000, SEQ ID NO: 1006, SEQ ID NO: 1012, SEQ ID NO: 1018, SEQ ID NO: 1024, SEQ ID NO: 1030, SEQ ID NO: 1036, SEQ ID NO: 1042, SEQ ID NO: 1048, SEQ ID NO: 1054, SEQ ID NO: 1060, SEQ ID NO: 1066, SEQ ID NO: 1072, SEQ ID NO: 1078, SEQ ID NO: 1084, SEQ ID NO: 1090, SEQ ID NO: 1096, SEQ ID NO: 1102, SEQ ID NO: 1108, SEQ ID NO: 1114, SEQ ID NO: 1120, SEQ ID NO: 1126, SEQ ID NO: 1132, SEQ ID NO: 1138, SEQ ID NO: 1144, SEQ ID NO: 1150, SEQ ID NO: 1156, SEQ ID NO: 1162, SEQ ID NO: 1168, SEQ ID NO: 1174, SEQ ID NO: 1180, SEQ ID NO: 1186, SEQ ID NO: 1192, SEQ ID NO: 1198, SEQ ID NO: 1204, SEQ ID NO: 1210, SEQ ID NO: 1216, SEQ ID NO: 1222, SEQ ID NO: 1228, SEQ ID NO: 1234, SEQ ID NO: 1240, SEQ ID NO: 1246, SEQ ID NO: 1252, SEQ ID NO: 1258, SEQ ID NO: 1264, SEQ ID NO: 1270, SEQ ID NO: 1276, SEQ ID NO: 1282, SEQ ID NO: 1288, SEQ ID NO: 1294, SEQ ID NO: 1300, SEQ ID NO: 1306, SEQ ID NO: 1312, SEQ ID NO: 1318, SEQ ID NO: 1324, SEQ ID NO: 1330, SEQ ID NO: 1336, SEQ ID NO: 1342, SEQ ID NO: 1348, SEQ ID NO: 1354, SEQ ID NO: 1360, SEQ ID NO: 1366, SEQ ID NO: 1372, SEQ ID NO: 1378, SEQ ID NO: 1384, SEQ ID NO: 1390, SEQ ID NO: 1396, SEQ ID NO: 1402, SEQ ID NO: 1408, SEQ ID NO: 1414, SEQ ID NO: 1420, SEQ ID NO: 1426, SEQ ID NO: 1432, SEQ ID NO: 1438, SEQ ID NO: 1444, SEQ ID NO: 1450. SEQ ID NO: 1456, SEQ ID NO: 1462,

SEQ ID NO: 1468, SEQ ID NO: 1474, SEQ ID NO: 1480, SEQ ID NO: 1486, SEQ ID NO: 1492, SEQ ID NO: 1498, SEQ ID NO: 1504, SEQ ID NO: 1510, SEQ ID NO: 1516, SEQ ID NO: 1522, SEQ ID NO: 1596, SEQ ID NO: 1528, SEQ ID NO: 1534, SEQ ID NO: 1540, SEQ ID NO: 1546, SEQ ID NO: 1552, SEQ ID NO: 1558, SEQ ID NO: 1564, SEQ ID NO: 1570, SEQ ID NO: 1576, SEQ ID NO: 1582, or SEQ ID NO: 1588 as shown in Figure 3A, 3B, or 3C, a light chain CDR2 comprising the amino acid sequence of any one of the LCDR2s in SEQ ID NO: 401, SEQ ID NO: 407, SEQ ID NO: 413, SEQ ID NO: 419, SEQ ID NO: 425, SEQ ID NO: 431, SEQ ID NO: 437, SEQ ID NO: 443, SEQ ID NO: 449, SEQ ID NO: 455, SEQ ID NO: 461, SEQ ID NO: 467, SEQ ID NO: 473, SEQ ID NO: 479, SEQ ID NO: 485, SEQ ID NO: 491, SEQ ID NO: 497, SEQ ID NO: 503, SEQ ID NO: 509, SEQ ID NO: 515, SEQ ID NO: 521, SEQ ID NO: 527, SEQ ID NO: 533, SEQ ID NO: 539, SEQ ID NO: 545, SEQ ID NO: 551, SEQ ID NO: 557, SEQ ID NO: 563, SEQ ID NO: 569, SEQ ID NO: 575, SEQ ID NO: 581, SEQ ID NO: 587, SEQ ID NO: 593, SEQ ID NO: 599, SEQ ID NO: 605, SEQ ID NO: 611, SEQ ID NO: 617, SEQ ID NO: 623, SEQ ID NO: 629, SEQ ID NO: 635, SEQ ID NO: 641, SEQ ID NO: 647, SEQ ID NO: 653, SEQ ID NO: 659, SEQ ID NO: 665, SEQ ID NO: 671, SEQ ID NO: 677, SEQ ID NO: 683, SEQ ID NO: 689, SEQ ID NO: 695, SEQ ID NO: 701, SEQ ID NO: 707, SEQ ID NO: 713, SEQ ID NO: 719, SEQ ID NO: 725, SEQ ID NO: 731, SEQ ID NO: 737, SEQ ID NO: 743, SEQ ID NO: 749, SEQ ID NO: 755, SEQ ID NO: 761, SEQ ID NO: 767, SEQ ID NO: 773, SEQ ID NO: 779, SEQ ID NO: 785, SEQ ID NO: 791, SEQ ID NO: 797, SEQ ID NO: 803, SEQ ID NO: 809, SEQ ID NO: 815, SEQ ID NO: 821, SEQ ID NO: 827, SEQ ID NO: 833, SEQ ID NO: 839, SEQ ID NO: 845, SEQ ID NO: 851, SEQ ID NO: 857, SEQ ID NO: 863, SEQ ID NO: 869, SEQ ID NO: 875, SEQ ID NO: 881, SEQ ID NO: 887, SEQ ID NO: 893, SEQ ID NO: 899, SEQ ID NO: 905, SEQ ID NO: 911, SEQ ID NO: 917, SEQ ID NO: 923, SEQ ID NO: 929, SEQ ID NO: 935, SEQ ID NO: 941, SEQ ID NO: 947, SEQ ID NO: 953, SEQ ID NO: 959, SEQ ID NO: 965, SEQ ID NO: 971, SEQ ID NO: 977, SEQ ID NO: 983, SEQ ID NO: 989, SEQ ID NO: 995, SEQ ID NO: 1001, SEQ ID NO: 1007, SEQ ID NO: 1013, SEQ ID NO: 1019, SEQ ID NO: 1025, SEQ ID NO: 1031, SEQ ID NO: 1037, SEQ ID NO: 1043, SEQ ID NO: 1049, SEQ ID NO: 1055, SEQ ID NO: 1061, SEQ ID NO: 1067, SEQ ID NO: 1073, SEQ ID NO: 1079, SEQ ID NO: 1085, SEQ ID NO: 1091, SEQ ID NO: 1097, SEQ ID NO: 1103,

SEQ ID NO: 1109, SEQ ID NO: 1115, SEQ ID NO: 1121, SEQ ID NO: 1127, SEQ ID NO: 1133, SEQ ID NO: 1139, SEQ ID NO: 1145, SEQ ID NO: 1151, SEQ ID NO: 1157, SEQ ID NO: 1163, SEQ ID NO: 1169, SEQ ID NO: 1175, SEQ ID NO: 1181, SEQ ID NO: 1187, SEQ ID NO: 1193, SEQ ID NO: 1199, SEQ ID NO: 1205, SEQ ID NO: 1211, SEQ ID NO: 1217, SEQ ID NO: 1223, SEQ ID NO: 1229, SEQ ID NO: 1235, SEQ ID NO: 1241, SEQ ID NO: 1247, SEQ ID NO: 1253, SEQ ID NO: 1259, SEQ ID NO: 1265, SEQ ID NO: 1271, SEQ ID NO: 1277, SEQ ID NO: 1283, SEQ ID NO: 1289, SEQ ID NO: 1295, SEQ ID NO: 1301, SEQ ID NO: 1307, SEQ ID NO: 1313, SEQ ID NO: 1319, SEQ ID NO: 1325, SEQ ID NO: 1331, SEQ ID NO: 1337, SEQ ID NO: 1343, SEQ ID NO: 1349, SEQ ID NO: 1355, SEQ ID NO: 1361, SEQ ID NO: 1367, SEQ ID NO: 1373, SEQ ID NO: 1379, SEQ ID NO: 1385, SEQ ID NO: 1391, SEQ ID NO: 1397, SEQ ID NO: 1403, SEQ ID NO: 1409, SEQ ID NO: 1415, SEQ ID NO: 1421, SEQ ID NO: 1427, SEQ ID NO: 1433, SEQ ID NO: 1439, SEQ ID NO: 1445, SEQ ID NO: 1451, SEQ ID NO: 1457, SEQ ID NO: 1463, SEQ ID NO: 1469, SEQ ID NO: 1475, SEQ ID NO: 1481, SEQ ID NO: 1487, SEQ ID NO: 1493, SEQ ID NO: 1499, SEQ ID NO: 1505, SEQ ID NO: 1511, SEQ ID NO: 1517, SEQ ID NO: 1523, SEQ ID NO: 1597, SEQ ID NO: 1529, SEQ ID NO: 1535, SEQ ID NO: 1541, SEQ ID NO: 1547, SEQ ID NO: 1553, SEQ ID NO: 1559, SEQ ID NO: 1565, SEQ ID NO: 1571, SEQ ID NO: 1577, SEQ ID NO: 1583, or SEQ ID NO: 1589 as shown in Figure 3A, 3B, or 3C, and a light chain CDR3 comprising the amino acid sequence of any one of the LCDR3s in SEQ ID NO: 402, SEQ ID NO: 408, SEQ ID NO: 414, SEQ ID NO: 420, SEQ ID NO: 426, SEQ ID NO: 432, SEQ ID NO: 438, SEQ ID NO: 444, SEQ ID NO: 450, SEQ ID NO: 456, SEQ ID NO: 462, SEQ ID NO: 468, SEQ ID NO: 474, SEQ ID NO: 480, SEQ ID NO: 486, SEQ ID NO: 492, SEQ ID NO: 498, SEQ ID NO: 504, SEQ ID NO: 510, SEQ ID NO: 516, SEQ ID NO: 522, SEQ ID NO: 528, SEQ ID NO: 534, SEQ ID NO: 540, SEQ ID NO: 546, SEQ ID NO: 552, SEQ ID NO: 558, SEQ ID NO: 564, SEQ ID NO: 570, SEQ ID NO: 576, SEQ ID NO: 582, SEQ ID NO: 588, SEQ ID NO: 594, SEQ ID NO: 600, SEQ ID NO: 606, SEQ ID NO: 612, SEQ ID NO: 618, SEQ ID NO: 624, SEQ ID NO: 630, SEQ ID NO: 636, SEQ ID NO: 642, SEQ ID NO: 648, SEQ ID NO: 654, SEQ ID NO: 660, SEQ ID NO: 666, SEQ ID NO: 672, SEQ ID NO: 678, SEQ ID NO: 684, SEQ ID NO: 690, SEQ ID NO: 696, SEQ ID NO: 702, SEQ ID NO: 708, SEQ ID NO: 714, SEQ ID NO: 720, SEQ ID NO: 726, SEQ ID

NO: 732, SEQ ID NO: 738, SEQ ID NO: 744, SEQ ID NO: 750, SEQ ID NO: 756, SEQ ID NO: 762, SEQ ID NO: 768, SEQ ID NO: 774, SEQ ID NO: 780, SEQ ID NO: 786, SEQ ID NO: 792, SEQ ID NO: 798, SEQ ID NO: 804, SEQ ID NO: 810, SEQ ID NO: 816, SEQ ID NO: 822, SEQ ID NO: 828, SEQ ID NO: 834, SEQ ID NO: 840, SEQ ID NO: 846, SEQ ID NO: 852, SEQ ID NO: 858, SEQ ID NO: 864, SEQ ID NO: 870, SEQ ID NO: 876, SEQ ID NO: 882, SEQ ID NO: 888, SEQ ID NO: 894, SEQ ID NO: 900, SEQ ID NO: 906, SEQ ID NO: 912, SEQ ID NO: 918, SEQ ID NO: 924, SEQ ID NO: 930, SEQ ID NO: 936, SEQ ID NO: 942, SEQ ID NO: 948, SEQ ID NO: 954, SEQ ID NO: 960, SEQ ID NO: 966, SEQ ID NO: 972, SEQ ID NO: 978, SEQ ID NO: 984, SEQ ID NO: 990, SEQ ID NO: 996, SEQ ID NO: 1002, SEQ ID NO: 1008, SEQ ID NO: 1014, SEQ ID NO: 1020, SEQ ID NO: 1026, SEQ ID NO: 1032, SEQ ID NO: 1038, SEQ ID NO: 1044, SEQ ID NO: 1050, SEQ ID NO: 1056, SEQ ID NO: 1062, SEQ ID NO: 1068, SEQ ID NO: 1074, SEQ ID NO: 1080, SEQ ID NO: 1086, SEQ ID NO: 1092, SEQ ID NO: 1098, SEQ ID NO: 1104, SEQ ID NO: 1110, SEQ ID NO: 1116, SEQ ID NO: 1122, SEQ ID NO: 1128, SEQ ID NO: 1134, SEQ ID NO: 1140, SEQ ID NO: 1146, SEQ ID NO: 1152, SEQ ID NO: 1158, SEQ ID NO: 1164, SEQ ID NO: 1170, SEQ ID NO: 1176, SEQ ID NO: 1182, SEQ ID NO: 1188, SEQ ID NO: 1194, SEQ ID NO: 1200, SEQ ID NO: 1206, SEQ ID NO: 1212, SEQ ID NO: 1218, SEQ ID NO: 1224, SEQ ID NO: 1230, SEQ ID NO: 1236, SEQ ID NO: 1242, SEQ ID NO: 1248, SEQ ID NO: 1254, SEQ ID NO: 1260, SEQ ID NO: 1266, SEQ ID NO: 1272, SEQ ID NO: 1278, SEQ ID NO: 1284, SEQ ID NO: 1290, SEQ ID NO: 1296, SEQ ID NO: 1302, SEQ ID NO: 1308, SEQ ID NO: 1314, SEQ ID NO: 1320, SEQ ID NO: 1326, SEQ ID NO: 1332, SEQ ID NO: 1338, SEQ ID NO: 1344, SEQ ID NO: 1350, SEQ ID NO: 1356, SEQ ID NO: 1362, SEQ ID NO: 1368, SEQ ID NO: 1374, SEQ ID NO: 1380, SEQ ID NO: 1386, SEQ ID NO: 1392, SEQ ID NO: 1398, SEQ ID NO: 1404, SEQ ID NO: 1410, SEQ ID NO: 1416, SEQ ID NO: 1422, SEQ ID NO: 1428, SEQ ID NO: 1434, SEQ ID NO: 1440, SEQ ID NO: 1446, SEQ ID NO: 1452, SEQ ID NO: 1458, SEQ ID NO: 1464, SEQ ID NO: 1470, SEQ ID NO: 1476, SEQ ID NO: 1482, SEQ ID NO: 1488, SEQ ID NO: 1494, SEQ ID NO: 1500, SEQ ID NO: 1506, SEQ ID NO: 1512, SEQ ID NO: 1518, SEQ ID NO: 1524, SEQ ID NO: 1598, SEQ ID NO: 1530, SEQ ID NO: 1536, SEQ ID NO: 1542, SEQ ID NO: 1548, SEQ ID NO:

1554, SEQ ID NO: 1560, SEQ ID NO: 1566, SEQ ID NO: 1572, SEQ ID NO: 1578, SEQ ID NO: 1584, or SEQ ID NO: 1590 in Figure 3A, 3B, or 3C.

[0204] In some embodiments, an isolated antibody comprises a heavy chain CDR1 comprising the amino acid sequence of any of one of the HCDR1s in SEQ ID NO: 397, SEQ ID NO: 403. SEQ ID NO: 409, SEQ ID NO: 415, SEQ ID NO: 421, SEQ ID NO: 427, SEQ ID NO: 433, SEQ ID NO: 439, SEQ ID NO: 445, SEQ ID NO: 451, SEQ ID NO: 457, SEQ ID NO: 463, SEQ ID NO: 469, SEQ ID NO: 475, SEQ ID NO: 481, SEQ ID NO: 487, SEQ ID NO: 493, SEQ ID NO: 499, SEQ ID NO: 505, SEQ ID NO: 511, SEQ ID NO: 517, SEQ ID NO: 523, SEQ ID NO: 529, SEQ ID NO: 535, SEQ ID NO: 541, SEQ ID NO: 547, SEQ ID NO: 553, SEQ ID NO: 559, SEQ ID NO: 565, SEQ ID NO: 571, SEQ ID NO: 577, SEQ ID NO: 583, SEQ ID NO: 589, SEQ ID NO: 595, SEQ ID NO: 601, SEQ ID NO: 607, SEQ ID NO: 613, SEQ ID NO: 619, SEQ ID NO: 625, SEQ ID NO: 631, SEQ ID NO: 637, SEQ ID NO: 643, SEQ ID NO: 649, SEQ ID NO: 655, SEQ ID NO: 661, SEQ ID NO: 667, SEQ ID NO: 673, SEQ ID NO: 679, SEQ ID NO: 685, SEQ ID NO: 691, SEQ ID NO: 697, SEQ ID NO: 703, SEQ ID NO: 709, SEQ ID NO: 715, SEQ ID NO: 721, SEQ ID NO: 727, SEQ ID NO: 733, SEQ ID NO: 739, SEQ ID NO: 745, SEQ ID NO: 751, SEQ ID NO: 757, SEQ ID NO: 763, SEQ ID NO: 769, SEQ ID NO: 775, SEQ ID NO: 781, SEQ ID NO: 787, SEQ ID NO: 793, SEQ ID NO: 799, SEQ ID NO: 805, SEQ ID NO: 811, SEQ ID NO: 817, SEQ ID NO: 823, SEQ ID NO: 829, SEQ ID NO: 835, SEQ ID NO: 841, SEQ ID NO: 847, SEQ ID NO: 853, SEQ ID NO: 859, SEQ ID NO: 865, SEQ ID NO: 871, SEQ ID NO: 877, SEQ ID NO: 883, SEQ ID NO: 889, SEQ ID NO: 895, SEQ ID NO: 901, SEQ ID NO: 907, SEQ ID NO: 913, SEQ ID NO: 919, SEQ ID NO: 925, SEQ ID NO: 931, SEQ ID NO: 937, SEQ ID NO: 943, SEQ ID NO: 949, SEQ ID NO: 955, SEQ ID NO: 961, SEQ ID NO: 967, SEQ ID NO: 973, SEQ ID NO: 979, SEQ ID NO: 985, SEQ ID NO: 991, SEQ ID NO: 997, SEQ ID NO: 1003, SEQ ID NO: 1009, SEQ ID NO: 1015, SEQ ID NO: 1021, SEQ ID NO: 1027, SEQ ID NO: 1033, SEQ ID NO: 1039, SEQ ID NO: 1045, SEQ ID NO: 1051, SEQ ID NO: 1057, SEQ ID NO: 1063, SEQ ID NO: 1069, SEQ ID NO: 1075, SEQ ID NO: 1081, SEQ ID NO: 1087, SEQ ID NO: 1093, SEQ ID NO: 1099, SEQ ID NO: 1105, SEQ ID NO: 1111, SEQ ID NO: 1117, SEQ ID NO: 1123, SEQ ID NO: 1129, SEQ ID NO: 1135, SEQ ID NO: 1141, SEQ ID NO: 1147, SEQ ID NO: 1153, SEQ ID NO: 1159, SEQ ID NO:

1165, SEQ ID NO: 1171, SEQ ID NO: 1177, SEQ ID NO: 1183, SEQ ID NO: 1189, SEQ ID NO: 1195, SEQ ID NO: 1201, SEQ ID NO: 1207, SEQ ID NO: 1213, SEQ ID NO: 1219, SEQ ID NO: 1225, SEQ ID NO: 1231, SEQ ID NO: 1237, SEQ ID NO: 1243, SEQ ID NO: 1249, SEQ ID NO: 1255, SEQ ID NO: 1261, SEQ ID NO: 1267, SEQ ID NO: 1273, SEQ ID NO: 1279, SEQ ID NO: 1285, SEQ ID NO: 1291, SEQ ID NO: 1297, SEQ ID NO: 1303, SEQ ID NO: 1309, SEQ ID NO: 1315, SEQ ID NO: 1321, SEQ ID NO: 1327, SEQ ID NO: 1333, SEQ ID NO: 1339, SEQ ID NO: 1345, SEQ ID NO: 1351, SEQ ID NO: 1357, SEQ ID NO: 1363, SEQ ID NO: 1369, SEQ ID NO: 1375, SEQ ID NO: 1381, SEQ ID NO: 1387, SEQ ID NO: 1393, SEQ ID NO: 1399, SEQ ID NO: 1405, SEQ ID NO: 1411, SEQ ID NO: 1417, SEQ ID NO: 1423, SEQ ID NO: 1429, SEQ ID NO: 1435, SEQ ID NO: 1441, SEQ ID NO: 1447, SEQ ID NO: 1453, SEQ ID NO: 1459, SEQ ID NO: 1465, SEQ ID NO: 1471, SEQ ID NO: 1477, SEQ ID NO: 1483, SEQ ID NO: 1489, SEQ ID NO: 1495, SEQ ID NO: 1501, SEQ ID NO: 1507, SEQ ID NO: 1513, SEQ ID NO: 1519, SEQ ID NO: 1593, SEQ ID NO: 1525 SEQ ID NO: 1531, SEQ ID NO: 1537, SEQ ID NO: 1543, SEQ ID NO: 1549, SEQ ID NO: 1555, SEQ ID NO: 1561, SEQ ID NO: 1567, SEQ ID NO: 1573, SEQ ID NO: 1579, or SEQ ID NO: 1585 as shown in Figure 3A, 3B, or 3C, a heavy chain CDR2 comprising the amino acid sequence of any one of the HCDR2s in SEQ ID NO: 398, SEQ ID NO: 404, SEQ ID NO: 410, SEQ ID NO: 416, SEQ ID NO: 422, SEQ ID NO: 428, SEQ ID NO: 434, SEQ ID NO: 440, SEQ ID NO: 446, SEQ ID NO: 452, SEQ ID NO: 458, SEQ ID NO: 464, SEQ ID NO: 470, SEQ ID NO: 476, SEQ ID NO: 482, SEQ ID NO: 488, SEQ ID NO: 494, SEQ ID NO: 500, SEQ ID NO: 506, SEQ ID NO: 512, SEQ ID NO: 518, SEQ ID NO: 524, SEQ ID NO: 530, SEQ ID NO: 536, SEQ ID NO: 542, SEQ ID NO: 548, SEQ ID NO: 554, SEQ ID NO: 560, SEQ ID NO: 566, SEQ ID NO: 572, SEQ ID NO: 578, SEQ ID NO: 584, SEQ ID NO: 590, SEQ ID NO: 596, SEQ ID NO: 602, SEQ ID NO: 608, SEQ ID NO: 614, SEQ ID NO: 620, SEQ ID NO: 626, SEQ ID NO: 632, SEQ ID NO: 638, SEQ ID NO: 644, SEQ ID NO: 650, SEQ ID NO: 656, SEQ ID NO: 662, SEQ ID NO: 668, SEQ ID NO: 674, SEQ ID NO: 680, SEQ ID NO: 686, SEQ ID NO: 692, SEQ ID NO: 698, SEQ ID NO: 704, SEQ ID NO: 710, SEQ ID NO: 716, SEQ ID NO: 722, SEQ ID NO: 728, SEQ ID NO: 734, SEQ ID NO: 740, SEQ ID NO: 746, SEQ ID NO: 752, SEQ ID NO: 758, SEQ ID NO: 764, SEQ ID NO: 770, SEQ ID NO: 776, SEQ ID NO: 782, SEQ ID NO: 788, SEQ ID

NO: 794, SEQ ID NO: 800, SEQ ID NO: 806, SEQ ID NO: 812, SEQ ID NO: 818, SEQ ID NO: 824, SEQ ID NO: 830, SEQ ID NO: 836, SEQ ID NO: 842, SEQ ID NO: 848, SEQ ID NO: 854, SEQ ID NO: 860, SEQ ID NO: 866, SEQ ID NO: 872, SEQ ID NO: 878, SEQ ID NO: 884, SEQ ID NO: 890, SEQ ID NO: 896, SEQ ID NO: 902, SEQ ID NO: 908, SEQ ID NO: 914, SEQ ID NO: 920, SEQ ID NO: 926, SEQ ID NO: 932, SEQ ID NO: 938, SEQ ID NO: 944, SEQ ID NO: 950, SEQ ID NO: 956, SEQ ID NO: 962, SEQ ID NO: 968, SEQ ID NO: 974, SEQ ID NO: 980, SEQ ID NO: 986, SEQ ID NO: 992, SEQ ID NO: 998, SEQ ID NO: 1004, SEQ ID NO: 1010, SEQ ID NO: 1016, SEQ ID NO: 1022, SEQ ID NO: 1028, SEQ ID NO: 1034, SEQ ID NO: 1040, SEQ ID NO: 1046, SEQ ID NO: 1052, SEQ ID NO: 1058, SEQ ID NO: 1064, SEQ ID NO: 1070, SEQ ID NO: 1076, SEQ ID NO: 1082, SEQ ID NO: 1088, SEQ ID NO: 1094, SEQ ID NO: 1100, SEQ ID NO: 1106, SEQ ID NO: 1112, SEQ ID NO: 1118, SEQ ID NO: 1124, SEQ ID NO: 1130, SEQ ID NO: 1136, SEQ ID NO: 1142, SEQ ID NO: 1148, SEQ ID NO: 1154, SEQ ID NO: 1160, SEQ ID NO: 1166, SEQ ID NO: 1172, SEQ ID NO: 1178, SEQ ID NO: 1184, SEQ ID NO: 1190, SEQ ID NO: 1196, SEQ ID NO: 1202, SEQ ID NO: 1208, SEQ ID NO: 1214, SEQ ID NO: 1220, SEQ ID NO: 1226, SEQ ID NO: 1232, SEQ ID NO: 1238, SEQ ID NO: 1244, SEQ ID NO: 1250, SEQ ID NO: 1256, SEQ ID NO: 1262, SEQ ID NO: 1268, SEQ ID NO: 1274, SEQ ID NO: 1280, SEQ ID NO: 1286, SEQ ID NO: 1292, SEQ ID NO: 1298, SEQ ID NO: 1304, SEQ ID NO: 1310, SEQ ID NO: 1316, SEQ ID NO: 1322, SEQ ID NO: 1328, SEQ ID NO: 1334, SEQ ID NO: 1340, SEQ ID NO: 1346, SEQ ID NO: 1352, SEQ ID NO: 1358, SEQ ID NO: 1364, SEQ ID NO: 1370, SEQ ID NO: 1376, SEQ ID NO: 1382, SEQ ID NO: 1388, SEQ ID NO: 1394, SEQ ID NO: 1400, SEQ ID NO: 1406, SEQ ID NO: 1412, SEQ ID NO: 1418, SEQ ID NO: 1424, SEQ ID NO: 1430, SEQ ID NO: 1436, SEQ ID NO: 1442, SEQ ID NO: 1448, SEQ ID NO: 1454, SEQ ID NO: 1460, SEQ ID NO: 1466, SEQ ID NO: 1472, SEQ ID NO: 1478, SEQ ID NO: 1484, SEQ ID NO: 1490, SEQ ID NO: 1496, SEQ ID NO: 1502, SEQ ID NO: 1508, SEQ ID NO: 1514, SEQ ID NO: 1520, SEQ ID NO: 1594, SEQ ID NO: 1526, SEQ ID NO: 1532, SEQ ID NO: 1538, SEQ ID NO: 1544, SEQ ID NO: 1550, SEQ ID NO: 1556, SEQ ID NO: 1562, SEQ ID NO: 1568, SEQ ID NO: 1574, SEQ ID NO: 1580, or SEQ ID NO: 1586 as shown in Figure 3A, 3B, or 3C, a heavy chain CDR3 comprising the amino acid sequence of any one of the HCDR3s in SEQ ID NO: 399, SEQ ID NO: 405, SEQ ID

NO: 411, SEQ ID NO: 417, SEQ ID NO: 423, SEQ ID NO: 429, SEQ ID NO: 435, SEQ ID NO: 441, SEQ ID NO: 447, SEQ ID NO: 453, SEQ ID NO: 459, SEQ ID NO: 465, SEQ ID NO: 471, SEQ ID NO: 477, SEQ ID NO: 483, SEQ ID NO: 489, SEQ ID NO: 495, SEQ ID NO: 501, SEQ ID NO: 507, SEQ ID NO: 513, SEQ ID NO: 519, SEQ ID NO: 525, SEQ ID NO: 531, SEQ ID NO: 537, SEQ ID NO: 543, SEQ ID NO: 549, SEQ ID NO: 555, SEQ ID NO: 561, SEQ ID NO: 567, SEQ ID NO: 573, SEQ ID NO: 579, SEQ ID NO: 585, SEQ ID NO: 591, SEQ ID NO: 597, SEQ ID NO: 603, SEQ ID NO: 609, SEQ ID NO: 615, SEQ ID NO: 621, SEQ ID NO: 627, SEQ ID NO: 633, SEQ ID NO: 639, SEQ ID NO: 645, SEQ ID NO: 651, SEQ ID NO: 657, SEQ ID NO: 663, SEQ ID NO: 669, SEQ ID NO: 675, SEQ ID NO: 681, SEQ ID NO: 687, SEQ ID NO: 693, SEQ ID NO: 699, SEQ ID NO: 705, SEQ ID NO: 711, SEQ ID NO: 717, SEQ ID NO: 723, SEQ ID NO: 729, SEQ ID NO: 735, SEQ ID NO: 741, SEQ ID NO: 747, SEQ ID NO: 753, SEQ ID NO: 759, SEQ ID NO: 765, SEQ ID NO: 771, SEQ ID NO: 777, SEQ ID NO: 783, SEQ ID NO: 789, SEQ ID NO: 795, SEQ ID NO: 801, SEQ ID NO: 807, SEQ ID NO: 813, SEQ ID NO: 819, SEQ ID NO: 825, SEQ ID NO: 831, SEQ ID NO: 837, SEQ ID NO: 843, SEQ ID NO: 849, SEQ ID NO: 855, SEQ ID NO: 861, SEQ ID NO: 867, SEQ ID NO: 873, SEQ ID NO: 879, SEQ ID NO: 885, SEQ ID NO: 891, SEQ ID NO: 897, SEQ ID NO: 903, SEQ ID NO: 909, SEQ ID NO: 915, SEQ ID NO: 921, SEQ ID NO: 927, SEQ ID NO: 933, SEQ ID NO: 939, SEQ ID NO: 945, SEQ ID NO: 951, SEQ ID NO: 957, SEQ ID NO: 963, SEQ ID NO: 969, SEQ ID NO: 975, SEQ ID NO: 981, SEQ ID NO: 987, SEQ ID NO: 993, SEQ ID NO: 999, SEQ ID NO: 1005, SEQ ID NO: 1011, SEQ ID NO: 1017, SEQ ID NO: 1023, SEQ ID NO: 1029, SEQ ID NO: 1035, SEQ ID NO: 1041, SEQ ID NO: 1047, SEQ ID NO: 1053, SEQ ID NO: 1059, SEQ ID NO: 1065, SEQ ID NO: 1071, SEQ ID NO: 1077, SEQ ID NO: 1083, SEQ ID NO: 1089, SEQ ID NO: 1095, SEQ ID NO: 1101, SEQ ID NO: 1107, SEQ ID NO: 1113, SEQ ID NO: 1119, SEQ ID NO: 1125, SEQ ID NO: 1131, SEQ ID NO: 1137, SEQ ID NO: 1143, SEQ ID NO: 1149, SEQ ID NO: 1155, SEQ ID NO: 1161, SEQ ID NO: 1167, SEQ ID NO: 1173, SEQ ID NO: 1179, SEQ ID NO: 1185, SEQ ID NO: 1191, SEQ ID NO: 1197, SEQ ID NO: 1203, SEQ ID NO: 1209, SEQ ID NO: 1215, SEQ ID NO: 1221, SEQ ID NO: 1227, SEQ ID NO: 1233, SEQ ID NO: 1239, SEQ ID NO: 1245, SEQ ID NO: 1251, SEQ ID NO: 1257, SEQ ID NO: 1263, SEQ ID NO: 1269, SEQ ID NO: 1275, SEQ ID NO: 1281, SEQ ID NO: 1287,

SEQ ID NO: 1293, SEQ ID NO: 1299, SEQ ID NO: 1305, SEQ ID NO: 1311, SEQ ID NO: 1317, SEQ ID NO: 1323, SEQ ID NO: 1329, SEQ ID NO: 1335, SEQ ID NO: 1341, SEQ ID NO: 1347, SEQ ID NO: 1353, SEQ ID NO: 1359, SEQ ID NO: 1365, SEQ ID NO: 1371, SEQ ID NO: 1377, SEQ ID NO: 1383, SEQ ID NO: 1389, SEQ ID NO: 1395, SEQ ID NO: 1401, SEQ ID NO: 1407, SEQ ID NO: 1413, SEQ ID NO: 1419, SEQ ID NO: 1425, SEQ ID NO: 1431, SEQ ID NO: 1437, SEQ ID NO: 1443, SEQ ID NO: 1449, SEQ ID NO: 1455, SEQ ID NO: 1461, SEQ ID NO: 1467, SEQ ID NO: 1473, SEQ ID NO: 1479, SEQ ID NO: 1485, SEQ ID NO: 1491, SEQ ID NO: 1497, SEQ ID NO: 1503, SEQ ID NO: 1509, SEQ ID NO: 1515, SEQ ID NO: 1521, SEQ ID NO: 1595, SEQ ID NO: 1527, SEQ ID NO: 1533, SEQ ID NO: 1539, SEQ ID NO: 1545, SEQ ID NO: 1551, SEQ ID NO: 1557, SEQ ID NO: 1563, SEQ ID NO: 1569, SEQ ID NO: 1575, SEQ ID NO: 1581, or SEQ ID NO: 1587 as shown in Figure 3A, 3B, or 3C, a light chain CDR1 comprising the amino acid sequence of any one of the LCDR1s in SEQ ID NO: 400, SEQ ID NO: 406, SEQ ID NO: 412, SEQ ID NO: 418, SEQ ID NO: 424, SEQ ID NO: 430, SEQ ID NO: 436, SEQ ID NO: 442, SEQ ID NO: 448, SEQ ID NO: 454, SEQ ID NO: 460, SEQ ID NO: 466, SEQ ID NO: 472, SEQ ID NO: 478, SEQ ID NO: 484, SEQ ID NO: 490, SEQ ID NO: 496, SEQ ID NO: 502, SEQ ID NO: 508, SEQ ID NO: 514, SEQ ID NO: 520, SEQ ID NO: 526, SEQ ID NO: 532, SEQ ID NO: 538, SEQ ID NO: 544, SEQ ID NO: 550, SEQ ID NO: 556, SEQ ID NO: 562, SEQ ID NO: 568, SEQ ID NO: 574, SEQ ID NO: 580, SEQ ID NO: 586, SEQ ID NO: 592, SEQ ID NO: 598, SEQ ID NO: 604, SEQ ID NO: 610, SEQ ID NO: 616, SEQ ID NO: 622, SEQ ID NO: 628, SEQ ID NO: 634, SEQ ID NO: 640, SEQ ID NO: 646, SEQ ID NO: 652, SEQ ID NO: 658, SEQ ID NO: 664, SEQ ID NO: 670, SEQ ID NO: 676, SEQ ID NO: 682, SEQ ID NO: 688, SEQ ID NO: 694, SEQ ID NO: 700, SEQ ID NO: 706, SEQ ID NO: 712, SEQ ID NO: 718, SEQ ID NO: 724, SEQ ID NO: 730, SEQ ID NO: 736, SEQ ID NO: 742, SEQ ID NO: 748, SEQ ID NO: 754, SEQ ID NO: 760, SEQ ID NO: 766, SEQ ID NO: 772, SEQ ID NO: 778, SEQ ID NO: 784, SEQ ID NO: 790, SEQ ID NO: 796, SEQ ID NO: 802, SEQ ID NO: 808, SEQ ID NO: 814, SEQ ID NO: 820, SEQ ID NO: 826, SEQ ID NO: 832, SEQ ID NO: 838, SEQ ID NO: 844, SEQ ID NO: 850, SEQ ID NO: 856, SEQ ID NO: 862, SEQ ID NO: 868, SEQ ID NO: 874, SEQ ID NO: 880, SEQ ID NO: 886, SEQ ID NO: 892, SEQ ID NO: 898, SEQ ID NO: 904, SEQ ID NO: 910, SEQ ID NO: 916, SEQ ID NO: 922, SEQ ID

NO: 928, SEQ ID NO: 934, SEQ ID NO: 940, SEQ ID NO: 946, SEQ ID NO: 952, SEQ ID NO: 958, SEQ ID NO: 964, SEQ ID NO: 970, SEQ ID NO: 976, SEQ ID NO: 982, SEQ ID NO: 988, SEQ ID NO: 994, SEQ ID NO: 1000, SEQ ID NO: 1006, SEQ ID NO: 1012, SEQ ID NO: 1018, SEQ ID NO: 1024, SEQ ID NO: 1030, SEQ ID NO: 1036, SEQ ID NO: 1042, SEQ ID NO: 1048, SEQ ID NO: 1054, SEQ ID NO: 1060, SEQ ID NO: 1066, SEQ ID NO: 1072, SEQ ID NO: 1078, SEQ ID NO: 1084, SEQ ID NO: 1090, SEQ ID NO: 1096, SEQ ID NO: 1102, SEQ ID NO: 1108, SEQ ID NO: 1114, SEQ ID NO: 1120, SEQ ID NO: 1126, SEQ ID NO: 1132, SEQ ID NO: 1138, SEQ ID NO: 1144, SEQ ID NO: 1150, SEQ ID NO: 1156, SEQ ID NO: 1162, SEQ ID NO: 1168, SEQ ID NO: 1174, SEQ ID NO: 1180, SEQ ID NO: 1186, SEQ ID NO: 1192, SEQ ID NO: 1198, SEQ ID NO: 1204, SEQ ID NO: 1210, SEQ ID NO: 1216, SEQ ID NO: 1222, SEQ ID NO: 1228, SEQ ID NO: 1234, SEQ ID NO: 1240, SEQ ID NO: 1246, SEQ ID NO: 1252, SEQ ID NO: 1258, SEQ ID NO: 1264, SEQ ID NO: 1270, SEQ ID NO: 1276, SEQ ID NO: 1282, SEQ ID NO: 1288, SEQ ID NO: 1294, SEQ ID NO: 1300, SEQ ID NO: 1306, SEQ ID NO: 1312, SEQ ID NO: 1318, SEQ ID NO: 1324, SEQ ID NO: 1330, SEQ ID NO: 1336, SEQ ID NO: 1342, SEQ ID NO: 1348, SEQ ID NO: 1354, SEQ ID NO: 1360, SEQ ID NO: 1366, SEQ ID NO: 1372, SEQ ID NO: 1378, SEQ ID NO: 1384, SEQ ID NO: 1390, SEQ ID NO: 1396, SEQ ID NO: 1402, SEQ ID NO: 1408, SEQ ID NO: 1414, SEQ ID NO: 1420, SEQ ID NO: 1426, SEQ ID NO: 1432, SEQ ID NO: 1438, SEQ ID NO: 1444, SEQ ID NO: 1450. SEQ ID NO: 1456, SEQ ID NO: 1462, SEQ ID NO: 1468, SEQ ID NO: 1474, SEQ ID NO: 1480, SEQ ID NO: 1486, SEQ ID NO: 1492, SEQ ID NO: 1498, SEQ ID NO: 1504, SEQ ID NO: 1510, SEQ ID NO: 1516, SEQ ID NO: 1522, SEQ ID NO: 1596, SEQ ID NO: 1528, SEQ ID NO: 1534, SEQ ID NO: 1540, SEQ ID NO: 1546, SEQ ID NO: 1552, SEQ ID NO: 1558, SEQ ID NO: 1564, SEQ ID NO: 1570, SEQ ID NO: 1576, SEQ ID NO: 1582, or SEQ ID NO: 1588 as shown in Figure 3A, 3B, or 3C, a light chain CDR2 comprising the amino acid sequence of any one of the LCDR2s in SEQ ID NO: 401, SEQ ID NO: 407, SEQ ID NO: 413, SEQ ID NO: 419, SEQ ID NO: 425, SEQ ID NO: 431, SEQ ID NO: 437, SEQ ID NO: 443, SEQ ID NO: 449, SEQ ID NO: 455, SEQ ID NO: 461, SEQ ID NO: 467, SEQ ID NO: 473, SEQ ID NO: 479, SEQ ID NO: 485, SEQ ID NO: 491, SEQ ID NO: 497, SEQ ID NO: 503, SEQ ID NO: 509, SEQ ID NO: 515, SEQ ID NO: 521, SEQ ID NO: 527, SEQ ID NO: 533, SEQ ID NO: 539, SEQ

ID NO: 545, SEQ ID NO: 551, SEQ ID NO: 557, SEQ ID NO: 563, SEQ ID NO: 569, SEQ ID NO: 575, SEQ ID NO: 581, SEQ ID NO: 587, SEQ ID NO: 593, SEQ ID NO: 599, SEQ ID NO: 605, SEQ ID NO: 611, SEQ ID NO: 617, SEQ ID NO: 623, SEQ ID NO: 629, SEQ ID NO: 635, SEQ ID NO: 641, SEQ ID NO: 647, SEQ ID NO: 653, SEQ ID NO: 659, SEQ ID NO: 665, SEQ ID NO: 671, SEQ ID NO: 677, SEQ ID NO: 683, SEQ ID NO: 689, SEQ ID NO: 695, SEQ ID NO: 701, SEQ ID NO: 707, SEQ ID NO: 713, SEQ ID NO: 719, SEQ ID NO: 725, SEQ ID NO: 731, SEQ ID NO: 737, SEQ ID NO: 743, SEQ ID NO: 749, SEQ ID NO: 755, SEQ ID NO: 761, SEQ ID NO: 767, SEQ ID NO: 773, SEQ ID NO: 779, SEQ ID NO: 785, SEQ ID NO: 791, SEQ ID NO: 797, SEQ ID NO: 803, SEQ ID NO: 809, SEQ ID NO: 815, SEQ ID NO: 821, SEQ ID NO: 827, SEQ ID NO: 833, SEQ ID NO: 839, SEQ ID NO: 845, SEQ ID NO: 851, SEQ ID NO: 857, SEQ ID NO: 863, SEQ ID NO: 869, SEQ ID NO: 875, SEQ ID NO: 881, SEQ ID NO: 887, SEQ ID NO: 893, SEQ ID NO: 899, SEQ ID NO: 905, SEQ ID NO: 911, SEQ ID NO: 917, SEQ ID NO: 923, SEQ ID NO: 929, SEQ ID NO: 935, SEQ ID NO: 941, SEQ ID NO: 947, SEQ ID NO: 953, SEQ ID NO: 959, SEQ ID NO: 965, SEQ ID NO: 971, SEQ ID NO: 977, SEQ ID NO: 983, SEQ ID NO: 989, SEQ ID NO: 995, SEQ ID NO: 1001, SEQ ID NO: 1007, SEQ ID NO: 1013, SEQ ID NO: 1019, SEQ ID NO: 1025, SEQ ID NO: 1031, SEQ ID NO: 1037, SEQ ID NO: 1043, SEQ ID NO: 1049, SEQ ID NO: 1055, SEQ ID NO: 1061, SEQ ID NO: 1067, SEQ ID NO: 1073, SEQ ID NO: 1079, SEQ ID NO: 1085, SEQ ID NO: 1091, SEQ ID NO: 1097, SEQ ID NO: 1103, SEQ ID NO: 1109, SEQ ID NO: 1115, SEQ ID NO: 1121, SEQ ID NO: 1127, SEQ ID NO: 1133, SEQ ID NO: 1139, SEQ ID NO: 1145, SEQ ID NO: 1151, SEQ ID NO: 1157, SEQ ID NO: 1163, SEQ ID NO: 1169, SEQ ID NO: 1175, SEQ ID NO: 1181, SEQ ID NO: 1187, SEQ ID NO: 1193, SEQ ID NO: 1199, SEQ ID NO: 1205, SEQ ID NO: 1211, SEQ ID NO: 1217, SEQ ID NO: 1223, SEQ ID NO: 1229, SEQ ID NO: 1235, SEQ ID NO: 1241, SEQ ID NO: 1247, SEQ ID NO: 1253, SEQ ID NO: 1259, SEQ ID NO: 1265, SEQ ID NO: 1271, SEQ ID NO: 1277, SEQ ID NO: 1283, SEQ ID NO: 1289, SEQ ID NO: 1295, SEQ ID NO: 1301, SEQ ID NO: 1307, SEQ ID NO: 1313, SEQ ID NO: 1319, SEQ ID NO: 1325, SEQ ID NO: 1331, SEQ ID NO: 1337, SEQ ID NO: 1343, SEQ ID NO: 1349, SEQ ID NO: 1355, SEQ ID NO: 1361, SEQ ID NO: 1367, SEQ ID NO: 1373, SEQ ID NO: 1379, SEQ ID NO: 1385, SEQ ID NO: 1391, SEQ ID NO: 1397, SEQ ID NO: 1403, SEQ ID NO: 1409, SEQ ID

NO: 1415, SEQ ID NO: 1421, SEQ ID NO: 1427, SEQ ID NO: 1433, SEQ ID NO: 1439, SEQ ID NO: 1445, SEQ ID NO: 1451, SEQ ID NO: 1457, SEQ ID NO: 1463, SEQ ID NO: 1469, SEQ ID NO: 1475, SEQ ID NO: 1481, SEQ ID NO: 1487, SEQ ID NO: 1493, SEQ ID NO: 1499, SEQ ID NO: 1505, SEQ ID NO: 1511, SEQ ID NO: 1517, SEQ ID NO: 1523, SEQ ID NO: 1597, SEQ ID NO: 1529, SEQ ID NO: 1535, SEQ ID NO: 1541, SEQ ID NO: 1547, SEQ ID NO: 1553, SEQ ID NO: 1559, SEQ ID NO: 1565, SEQ ID NO: 1571, SEQ ID NO: 1577, SEQ ID NO: 1583, or SEQ ID NO: 1589 as shown in Figure 3A, 3B, or 3C, and a light chain CDR3 comprising the amino acid sequence of any one of the LCDR3s in SEQ ID NO: 402, SEQ ID NO: 408, SEQ ID NO: 414, SEQ ID NO: 420, SEQ ID NO: 426, SEQ ID NO: 432, SEQ ID NO: 438, SEQ ID NO: 444, SEQ ID NO: 450, SEQ ID NO: 456, SEQ ID NO: 462, SEQ ID NO: 468, SEQ ID NO: 474, SEQ ID NO: 480, SEQ ID NO: 486, SEQ ID NO: 492, SEQ ID NO: 498, SEQ ID NO: 504, SEQ ID NO: 510, SEQ ID NO: 516, SEQ ID NO: 522, SEQ ID NO: 528, SEQ ID NO: 534, SEQ ID NO: 540, SEQ ID NO: 546, SEQ ID NO: 552, SEQ ID NO: 558, SEQ ID NO: 564, SEQ ID NO: 570, SEQ ID NO: 576, SEQ ID NO: 582, SEQ ID NO: 588, SEQ ID NO: 594, SEQ ID NO: 600, SEQ ID NO: 606, SEQ ID NO: 612, SEQ ID NO: 618, SEQ ID NO: 624, SEQ ID NO: 630, SEQ ID NO: 636, SEQ ID NO: 642, SEQ ID NO: 648, SEQ ID NO: 654, SEQ ID NO: 660, SEQ ID NO: 666, SEQ ID NO: 672, SEQ ID NO: 678, SEQ ID NO: 684, SEQ ID NO: 690, SEQ ID NO: 696, SEQ ID NO: 702, SEQ ID NO: 708, SEQ ID NO: 714, SEQ ID NO: 720, SEQ ID NO: 726, SEQ ID NO: 732, SEQ ID NO: 738, SEQ ID NO: 744, SEQ ID NO: 750, SEQ ID NO: 756, SEQ ID NO: 762, SEQ ID NO: 768, SEQ ID NO: 774, SEQ ID NO: 780, SEQ ID NO: 786, SEQ ID NO: 792, SEQ ID NO: 798, SEQ ID NO: 804, SEQ ID NO: 810, SEQ ID NO: 816, SEQ ID NO: 822, SEQ ID NO: 828, SEQ ID NO: 834, SEQ ID NO: 840, SEQ ID NO: 846, SEQ ID NO: 852, SEQ ID NO: 858, SEQ ID NO: 864, SEQ ID NO: 870, SEQ ID NO: 876, SEQ ID NO: 882, SEQ ID NO: 888, SEQ ID NO: 894, SEQ ID NO: 900, SEQ ID NO: 906, SEQ ID NO: 912, SEQ ID NO: 918, SEQ ID NO: 924, SEQ ID NO: 930, SEQ ID NO: 936, SEQ ID NO: 942, SEQ ID NO: 948, SEQ ID NO: 954, SEQ ID NO: 960, SEQ ID NO: 966, SEQ ID NO: 972, SEQ ID NO: 978, SEQ ID NO: 984, SEQ ID NO: 990, SEQ ID NO: 996, SEQ ID NO: 1002, SEQ ID NO: 1008, SEQ ID NO: 1014, SEQ ID NO: 1020, SEQ ID NO: 1026, SEQ ID NO: 1032, SEQ ID NO: 1038, SEQ ID NO: 1044, SEQ ID NO: 1050, SEQ ID NO:

1056, SEQ ID NO: 1062, SEQ ID NO: 1068, SEQ ID NO: 1074, SEQ ID NO: 1080, SEQ ID NO: 1086, SEQ ID NO: 1092, SEQ ID NO: 1098, SEQ ID NO: 1104, SEQ ID NO: 1110, SEQ ID NO: 1116, SEQ ID NO: 1122, SEQ ID NO: 1128, SEQ ID NO: 1134, SEQ ID NO: 1140, SEQ ID NO: 1146, SEQ ID NO: 1152, SEQ ID NO: 1158, SEQ ID NO: 1164, SEQ ID NO: 1170, SEQ ID NO: 1176, SEQ ID NO: 1182, SEQ ID NO: 1188, SEQ ID NO: 1194, SEQ ID NO: 1200, SEQ ID NO: 1206, SEQ ID NO: 1212, SEQ ID NO: 1218, SEQ ID NO: 1224, SEQ ID NO: 1230, SEQ ID NO: 1236, SEQ ID NO: 1242, SEQ ID NO: 1248, SEQ ID NO: 1254, SEQ ID NO: 1260, SEQ ID NO: 1266, SEQ ID NO: 1272, SEQ ID NO: 1278, SEQ ID NO: 1284, SEQ ID NO: 1290, SEQ ID NO: 1296, SEQ ID NO: 1302, SEQ ID NO: 1308, SEQ ID NO: 1314, SEQ ID NO: 1320, SEQ ID NO: 1326, SEQ ID NO: 1332, SEQ ID NO: 1338, SEQ ID NO: 1344, SEQ ID NO: 1350, SEQ ID NO: 1356, SEQ ID NO: 1362, SEQ ID NO: 1368, SEQ ID NO: 1374, SEQ ID NO: 1380, SEQ ID NO: 1386, SEQ ID NO: 1392, SEQ ID NO: 1398, SEQ ID NO: 1404, SEQ ID NO: 1410, SEQ ID NO: 1416, SEQ ID NO: 1422, SEQ ID NO: 1428, SEQ ID NO: 1434, SEQ ID NO: 1440, SEQ ID NO: 1446, SEQ ID NO: 1452, SEQ ID NO: 1458, SEQ ID NO: 1464, SEQ ID NO: 1470, SEQ ID NO: 1476, SEQ ID NO: 1482, SEQ ID NO: 1488, SEQ ID NO: 1494, SEQ ID NO: 1500, SEQ ID NO: 1506, SEQ ID NO: 1512, SEQ ID NO: 1518, SEQ ID NO: 1524, SEQ ID NO: 1598, SEQ ID NO: 1530, SEQ ID NO: 1536, SEQ ID NO: 1542, SEQ ID NO: 1548, SEQ ID NO: 1554, SEQ ID NO: 1560, SEQ ID NO: 1566, SEQ ID NO: 1572, SEQ ID NO: 1578, SEQ ID NO: 1584, or SEQ ID NO: 1590 in Figure 3A, 3B, or 3C, and the HCDR1, HCDR2, HCDR3, LCDR1, LCDR2, and LCDR3 are from a same clone.

[0205] In some embodiments, an isolated antibody comprises a heavy chain comprising the heavy chain amino acid variable sequence in any one of SEQ ID NO. 1 – SEQ ID NO: 97, SEQ ID NO: 195 – SEQ ID NO: 209, or SEQ ID NO: 225 – SEQ ID NO: 310 as shown in Figures 2A, 2B, or 2C.

[0206] In some embodiments, an isolated antibody comprises a heavy chain comprising the heavy chain amino acid variable sequence in any one of SEQ ID NO. 1 – SEQ ID NO: 97, SEQ ID NO: 195 – SEQ ID NO: 209, or SEQ ID NO: 225 – SEQ ID NO: 310 as shown in Figures 2A, 2B, or 2C, or a sequence at least 90% identical thereto.

[0207] In some embodiments, an isolated antibody comprises a heavy chain comprising the heavy chain amino acid variable sequence in any one of SEQ ID NO. 1 – SEQ ID NO: 97, SEQ ID NO: 195 – SEQ ID NO: 209, or SEQ ID NO: 225 – SEQ ID NO: 310 as shown in Figures 2A, 2B, or 2C, or a sequence with about 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 99.9% identity thereto, or a value within a range defined by any two of the aforementioned values.

[0208] In some embodiments, an isolated antibody that comprises a light chain comprising the light chain amino acid variable sequence in any one of SEQ ID NO: 98 – SEQ ID NO: 194, SEQ ID NO: 210 – SEQ ID NO: 224, or SEQ ID NO: 311 – SEQ ID NO: 396 as shown in Figures 2A, 2B, or 2C.

[0209] In some embodiments, an isolated antibody that comprises a light chain comprising the light chain amino acid variable sequence in any one of SEQ ID NO: 98 – SEQ ID NO: 194, SEQ ID NO: 210 – SEQ ID NO: 224, or SEQ ID NO: 311 – SEQ ID NO: 396 as shown in Figures 2A, 2B, or 2C, or a sequence at least 90% identical thereto.

[0210] In some embodiments, an isolated antibody that comprises a light chain comprising the light chain amino acid variable sequence in any one of SEQ ID NO: 98 – SEQ ID NO: 194, SEQ ID NO: 210 – SEQ ID NO: 224, or SEQ ID NO: 311 – SEQ ID NO: 396 as shown in Figures 2A, 2B, or 2C, or a sequence with about 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 99.9% identity thereto, or a value within a range defined by any two of the aforementioned values.

[0211] In some embodiments, an isolated antibody comprises a heavy chain comprising the heavy chain amino acid variable sequence in any one of SEQ ID NO. 1 – SEQ ID NO: 97, SEQ ID NO: 195 – SEQ ID NO: 209, or SEQ ID NO: 225 – SEQ ID NO: 310 as shown in Figures 2A, 2B, or 2C, and a light chain comprising the light chain amino acid variable sequence in any one of SEQ ID NO: 98 – SEQ ID NO: 194, SEQ ID NO: 210 – SEQ ID NO: 224, or SEQ ID NO: 311 – SEQ ID NO: 396 as shown in Figures 2A, 2B, or 2C.

[0212] In some embodiments, an isolated antibody comprises a heavy chain comprising the heavy chain amino acid variable sequence in any one of SEQ ID NO. 1 – SEQ ID NO: 97, SEQ ID NO: 195 – SEQ ID NO: 209, or SEQ ID NO: 225 – SEQ ID NO: 310 as shown in Figures 2A, 2B, or 2C, or a sequence at least 90% identical thereto, and a light

chain comprising the light chain amino acid variable sequence in any one of SEQ ID NO: 98 – SEQ ID NO: 194, SEQ ID NO: 210 – SEQ ID NO: 224, or SEQ ID NO: 311 – SEQ ID NO: 396 as shown in Figures 2A, 2B, or 2C or a sequence at least 90% identical thereto.

[0213] In some embodiments, an isolated antibody comprises a heavy chain comprising the heavy chain amino acid variable sequence in any one of SEQ ID NO. 1 – SEQ ID NO: 97, SEQ ID NO: 195 – SEQ ID NO: 209, or SEQ ID NO: 225 – SEQ ID NO: 310 as shown in Figures 2A, 2B, or 2C, or a sequence with about 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 99.9% identity thereto, or a value within a range defined by any two of the aforementioned values, and a light chain comprising the light chain amino acid variable sequence in any one of SEQ ID NO: 98 – SEQ ID NO: 194, SEQ ID NO: 210 – SEQ ID NO: 224, or SEQ ID NO: 311 – SEQ ID NO: 396 as shown in Figures 2A, 2B, or 2C, or a sequence with about 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 99.9% identity thereto, or a value within a range defined by any two of the aforementioned values.

[0214] In some embodiments, an isolated antigen binding molecule that binds to human TIGIT comprises a heavy chain variable region comprising the heavy chain of clone Ab117 (SEQ ID NO: 62) and a light chain variable region comprising the light chain of clone Ab117 (SEQ ID NO: 159).

[0215] In some embodiments, an isolated antigen binding molecule that binds to human TIGIT comprises a heavy chain variable region comprising the heavy chain of clone Ab53 (SEQ ID NO: 199) and a light chain variable region comprising the light chain of clone Ab53 (SEQ ID NO: 214).

[0216] In some embodiments, an isolated antigen binding molecule that binds to human TIGIT comprises a heavy chain variable region comprising the heavy chain of clone Ab40 (SEQ ID NO: 200) and a light chain variable region comprising the light chain of clone Ab40 (SEQ ID NO: 215).

[0217] In some embodiments, an isolated antigen binding molecule that binds to human TIGIT comprises a heavy chain variable region comprising the heavy chain of clone Ab48 (SEQ ID NO: 203) and a light chain variable region comprising the light chain of clone Ab48 (SEQ ID NO: 218).

[0218] In some embodiments, an isolated antigen binding molecule that binds to human TIGIT comprises a heavy chain variable region comprising the heavy chain of clone Ab1 (SEQ ID NO: 299) and a light chain variable region comprising the light chain of clone Ab1 (SEQ ID NO: 385).

[0219] In some embodiments, an isolated antigen binding molecule that binds to human TIGIT comprises a heavy chain variable region comprising the heavy chain of clone Ab143 (SEQ ID NO: 279) and a light chain variable region comprising the light chain of clone Ab143 (SEQ ID NO: 365).

[0220] In some embodiments, an isolated antigen binding molecule that binds to human TIGIT comprises a heavy chain variable region comprising the heavy chain of clone Ab117 (SEQ ID NO: 62) and a light chain variable region comprising the light chain of clone Ab117 (SEQ ID NO: 159), a heavy chain variable region comprising the heavy chain of clone Ab53 (SEQ ID NO: 199) and a light chain variable region comprising the light chain of clone Ab53 (SEQ ID NO: 214), a heavy chain variable region comprising the heavy chain of clone Ab40 (SEQ ID NO: 200) and a light chain variable region comprising the light chain of clone Ab40 (SEQ ID NO: 215), a heavy chain variable region comprising the heavy chain of clone Ab48 (SEQ ID NO: 203) and a light chain variable region comprising the light chain of clone Ab48 (SEQ ID NO: 218), a heavy chain variable region comprising the heavy chain of clone Ab1 (SEQ ID NO: 299) and a light chain variable region comprising the light chain of clone Ab1 (SEQ ID NO: 385), or a heavy chain variable region comprising the heavy chain of clone Ab143 (SEQ ID NO: 279) and a light chain variable region comprising the light chain of clone Ab143 (SEQ ID NO: 365).

[0221] All of the references cited herein, including patents, patent applications, papers, text books, and the like, and the references cited therein, to the extent that they are not already, are hereby incorporated herein by reference in their entirety. To the extent that any of the definitions or terms provided in the references incorporated by reference are inconsistent with the terms and discussion provided herein, the present terms and definitions control.

WHAT IS CLAIMED IS:

1. An isolated antigen binding molecule that competes for binding to human TIGIT with an antibody that comprises any one or more of a CDR within any of SEQ ID NO. 1 – SEQ ID NO: 97, SEQ ID NO: 195 – SEQ ID NO: 209, SEQ ID NO: 225 – SEQ ID NO: 310, SEQ ID NO: 98 – SEQ ID NO: 194, SEQ ID NO: 210 – SEQ ID NO: 224, or SEQ ID NO: 311 – SEQ ID NO: 396 in figures 2A, 2B, 2C, 3A, 3B, or 3C.
2. The isolated antigen binding molecule of claim 1, wherein the antigen binding molecule comprises all 6 CDRs from a single clone in any one of SEQ ID NO. 1 – SEQ ID NO: 97, SEQ ID NO: 195 – SEQ ID NO: 209, SEQ ID NO: 225 – SEQ ID NO: 310, SEQ ID NO: 98 – SEQ ID NO: 194, SEQ ID NO: 210 – SEQ ID NO: 224, or SEQ ID NO: 311 – SEQ ID NO: 396 in figures 2A, 2B, 2C, 3A, 3B, or 3C.
3. The isolated antigen binding molecule of claim 1, wherein the isolated antigen binding molecule comprises a heavy variable region (SEQ ID NO. 1 – SEQ ID NO: 97, SEQ ID NO: 195 – SEQ ID NO: 209, SEQ ID NO: 225 – SEQ ID NO: 310) and a light chain variable region (SEQ ID NO: 98 – SEQ ID NO: 194, SEQ ID NO: 210 – SEQ ID NO: 224, or SEQ ID NO: 311 – SEQ ID NO: 396) from a single clone identified in any one of figures 2A, 2B, or 2C.
4. An isolated antigen binding molecule that binds to human TIGIT, wherein the isolated antigen binding molecules comprises:
   (a) a heavy chain CDR1 comprising the amino acid sequence of any one of the HCDR1s in SEQ ID NO: 397, SEQ ID NO: 403. SEQ ID NO: 409, SEQ ID NO: 415, SEQ ID NO: 421, SEQ ID NO: 427, SEQ ID NO: 433, SEQ ID NO: 439, SEQ ID NO: 445, SEQ ID NO: 451, SEQ ID NO: 457, SEQ ID NO: 463, SEQ ID NO: 469, SEQ ID NO: 475, SEQ ID NO: 481, SEQ ID NO: 487, SEQ ID NO: 493, SEQ ID NO: 499, SEQ ID NO: 505, SEQ ID NO: 511, SEQ ID NO: 517, SEQ ID NO: 523, SEQ ID NO: 529, SEQ ID NO: 535, SEQ ID NO: 541, SEQ ID NO: 547, SEQ ID NO: 553, SEQ ID NO: 559, SEQ ID NO: 565, SEQ ID NO: 571, SEQ ID NO: 577, SEQ ID NO: 583, SEQ ID NO: 589, SEQ ID NO: 595,

SEQ ID NO: 601, SEQ ID NO: 607, SEQ ID NO: 613, SEQ ID NO: 619, SEQ ID NO: 625, SEQ ID NO: 631, SEQ ID NO: 637, SEQ ID NO: 643, SEQ ID NO: 649, SEQ ID NO: 655, SEQ ID NO: 661, SEQ ID NO: 667, SEQ ID NO: 673, SEQ ID NO: 679, SEQ ID NO: 685, SEQ ID NO: 691, SEQ ID NO: 697, SEQ ID NO: 703, SEQ ID NO: 709, SEQ ID NO: 715, SEQ ID NO: 721, SEQ ID NO: 727, SEQ ID NO: 733, SEQ ID NO: 739, SEQ ID NO: 745, SEQ ID NO: 751, SEQ ID NO: 757, SEQ ID NO: 763, SEQ ID NO: 769, SEQ ID NO: 775, SEQ ID NO: 781, SEQ ID NO: 787, SEQ ID NO: 793, SEQ ID NO: 799, SEQ ID NO: 805, SEQ ID NO: 811, SEQ ID NO: 817, SEQ ID NO: 823, SEQ ID NO: 829, SEQ ID NO: 835, SEQ ID NO: 841, SEQ ID NO: 847, SEQ ID NO: 853, SEQ ID NO: 859, SEQ ID NO: 865, SEQ ID NO: 871, SEQ ID NO: 877, SEQ ID NO: 883, SEQ ID NO: 889, SEQ ID NO: 895, SEQ ID NO: 901, SEQ ID NO: 907, SEQ ID NO: 913, SEQ ID NO: 919, SEQ ID NO: 925, SEQ ID NO: 931, SEQ ID NO: 937, SEQ ID NO: 943, SEQ ID NO: 949, SEQ ID NO: 955, SEQ ID NO: 961, SEQ ID NO: 967, SEQ ID NO: 973, SEQ ID NO: 979, SEQ ID NO: 985, SEQ ID NO: 991, SEQ ID NO: 997, SEQ ID NO: 1003, SEQ ID NO: 1009, SEQ ID NO: 1015, SEQ ID NO: 1021, SEQ ID NO: 1027, SEQ ID NO: 1033, SEQ ID NO: 1039, SEQ ID NO: 1045, SEQ ID NO: 1051, SEQ ID NO: 1057, SEQ ID NO: 1063, SEQ ID NO: 1069, SEQ ID NO: 1075, SEQ ID NO: 1081, SEQ ID NO: 1087, SEQ ID NO: 1093, SEQ ID NO: 1099, SEQ ID NO: 1105, SEQ ID NO: 1111, SEQ ID NO: 1117, SEQ ID NO: 1123, SEQ ID NO: 1129, SEQ ID NO: 1135, SEQ ID NO: 1141, SEQ ID NO: 1147, SEQ ID NO: 1153, SEQ ID NO: 1159, SEQ ID NO: 1165, SEQ ID NO: 1171, SEQ ID NO: 1177, SEQ ID NO: 1183, SEQ ID NO: 1189, SEQ ID NO: 1195, SEQ ID NO: 1201, SEQ ID NO: 1207, SEQ ID NO: 1213, SEQ ID NO: 1219, SEQ ID NO: 1225, SEQ ID NO: 1231, SEQ ID NO: 1237, SEQ ID NO: 1243, SEQ ID NO: 1249, SEQ ID NO: 1255, SEQ ID NO: 1261, SEQ ID NO: 1267, SEQ ID NO: 1273, SEQ ID NO: 1279, SEQ ID NO: 1285, SEQ ID NO: 1291, SEQ ID NO: 1297, SEQ ID NO: 1303, SEQ ID NO: 1309, SEQ ID NO: 1315, SEQ ID NO: 1321, SEQ ID NO: 1327, SEQ ID NO: 1333, SEQ ID NO: 1339, SEQ ID NO: 1345, SEQ ID

NO: 1351, SEQ ID NO: 1357, SEQ ID NO: 1363, SEQ ID NO: 1369, SEQ ID NO: 1375, SEQ ID NO: 1381, SEQ ID NO: 1387, SEQ ID NO: 1393, SEQ ID NO: 1399, SEQ ID NO: 1405, SEQ ID NO: 1411, SEQ ID NO: 1417, SEQ ID NO: 1423, SEQ ID NO: 1429, SEQ ID NO: 1435, SEQ ID NO: 1441, SEQ ID NO: 1447, SEQ ID NO: 1453, SEQ ID NO: 1459, SEQ ID NO: 1465, SEQ ID NO: 1471, SEQ ID NO: 1477, SEQ ID NO: 1483, SEQ ID NO: 1489, SEQ ID NO: 1495, SEQ ID NO: 1501, SEQ ID NO: 1507, SEQ ID NO: 1513, SEQ ID NO: 1519, SEQ ID NO: 1593, SEQ ID NO: 1525 SEQ ID NO: 1531, SEQ ID NO: 1537, SEQ ID NO: 1543, SEQ ID NO: 1549, SEQ ID NO: 1555, SEQ ID NO: 1561, SEQ ID NO: 1567, SEQ ID NO: 1573, SEQ ID NO: 1579, or SEQ ID NO: 1585 in Figure 3A, 3B, or 3C;

(b) a heavy chain CDR2 comprising the amino acid sequence of any one of the HCDR2s in SEQ ID NO: 398, SEQ ID NO: 404, SEQ ID NO: 410, SEQ ID NO: 416, SEQ ID NO: 422, SEQ ID NO: 428, SEQ ID NO: 434, SEQ ID NO: 440, SEQ ID NO: 446, SEQ ID NO: 452, SEQ ID NO: 458, SEQ ID NO: 464, SEQ ID NO: 470, SEQ ID NO: 476, SEQ ID NO: 482, SEQ ID NO: 488, SEQ ID NO: 494, SEQ ID NO: 500, SEQ ID NO: 506, SEQ ID NO: 512, SEQ ID NO: 518, SEQ ID NO: 524, SEQ ID NO: 530, SEQ ID NO: 536, SEQ ID NO: 542, SEQ ID NO: 548, SEQ ID NO: 554, SEQ ID NO: 560, SEQ ID NO: 566, SEQ ID NO: 572, SEQ ID NO: 578, SEQ ID NO: 584, SEQ ID NO: 590, SEQ ID NO: 596, SEQ ID NO: 602, SEQ ID NO: 608, SEQ ID NO: 614, SEQ ID NO: 620, SEQ ID NO: 626, SEQ ID NO: 632, SEQ ID NO: 638, SEQ ID NO: 644, SEQ ID NO: 650, SEQ ID NO: 656, SEQ ID NO: 662, SEQ ID NO: 668, SEQ ID NO: 674, SEQ ID NO: 680, SEQ ID NO: 686, SEQ ID NO: 692, SEQ ID NO: 698, SEQ ID NO: 704, SEQ ID NO: 710, SEQ ID NO: 716, SEQ ID NO: 722, SEQ ID NO: 728, SEQ ID NO: 734, SEQ ID NO: 740, SEQ ID NO: 746, SEQ ID NO: 752, SEQ ID NO: 758, SEQ ID NO: 764, SEQ ID NO: 770, SEQ ID NO: 776, SEQ ID NO: 782, SEQ ID NO: 788, SEQ ID NO: 794, SEQ ID NO: 800, SEQ ID NO: 806, SEQ ID NO: 812, SEQ ID NO: 818, SEQ ID NO: 824, SEQ ID NO: 830, SEQ ID NO: 836, SEQ ID NO: 842, SEQ ID NO: 848, SEQ ID NO: 854, SEQ ID

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NO: 1089, SEQ ID NO: 1095, SEQ ID NO: 1101, SEQ ID NO: 1107, SEQ ID NO: 1113, SEQ ID NO: 1119, SEQ ID NO: 1125, SEQ ID NO: 1131, SEQ ID NO: 1137, SEQ ID NO: 1143, SEQ ID NO: 1149, SEQ ID NO: 1155, SEQ ID NO: 1161, SEQ ID NO: 1167, SEQ ID NO: 1173, SEQ ID NO: 1179, SEQ ID NO: 1185, SEQ ID NO: 1191, SEQ ID NO: 1197, SEQ ID NO: 1203, SEQ ID NO: 1209, SEQ ID NO: 1215, SEQ ID NO: 1221, SEQ ID NO: 1227, SEQ ID NO: 1233, SEQ ID NO: 1239, SEQ ID NO: 1245, SEQ ID NO: 1251, SEQ ID NO: 1257, SEQ ID NO: 1263, SEQ ID NO: 1269, SEQ ID NO: 1275, SEQ ID NO: 1281, SEQ ID NO: 1287, SEQ ID NO: 1293, SEQ ID NO: 1299, SEQ ID NO: 1305, SEQ ID NO: 1311, SEQ ID NO: 1317, SEQ ID NO: 1323, SEQ ID NO: 1329, SEQ ID NO: 1335, SEQ ID NO: 1341, SEQ ID NO: 1347, SEQ ID NO: 1353, SEQ ID NO: 1359, SEQ ID NO: 1365, SEQ ID NO: 1371, SEQ ID NO: 1377, SEQ ID NO: 1383, SEQ ID NO: 1389, SEQ ID NO: 1395, SEQ ID NO: 1401, SEQ ID NO: 1407, SEQ ID NO: 1413, SEQ ID NO: 1419, SEQ ID NO: 1425, SEQ ID NO: 1431, SEQ ID NO: 1437, SEQ ID NO: 1443, SEQ ID NO: 1449, SEQ ID NO: 1455, SEQ ID NO: 1461, SEQ ID NO: 1467, SEQ ID NO: 1473, SEQ ID NO: 1479, SEQ ID NO: 1485, SEQ ID NO: 1491, SEQ ID NO: 1497, SEQ ID NO: 1503, SEQ ID NO: 1509, SEQ ID NO: 1515, SEQ ID NO: 1521, SEQ ID NO: 1595, SEQ ID NO: 1527, SEQ ID NO: 1533, SEQ ID NO: 1539, SEQ ID NO: 1545, SEQ ID NO: 1551, SEQ ID NO: 1557, SEQ ID NO: 1563, SEQ ID NO: 1569, SEQ ID NO: 1575, SEQ ID NO: 1581, or SEQ ID NO: 1587 in Figure 3A, 3B, or 3C,

wherein the HCDR1, HCDR2, and HCDR3 are from a same clone.

5. An isolated antigen binding molecule that binds to human TIGIT, wherein the isolated antigen binding molecule comprises:

(a) a heavy chain CDR1 comprising the amino acid sequence of any of one of the HCDR1s in SEQ ID NO: 397, SEQ ID NO: 403. SEQ ID NO: 409, SEQ ID NO: 415, SEQ ID NO: 421, SEQ ID NO: 427, SEQ ID NO: 433, SEQ ID NO: 439, SEQ ID NO: 445, SEQ ID NO: 451, SEQ ID NO: 457, SEQ ID NO: 463, SEQ ID NO: 469, SEQ ID NO: 475, SEQ ID NO: 481, SEQ ID NO: 487, SEQ ID NO:

493, SEQ ID NO: 499, SEQ ID NO: 505, SEQ ID NO: 511, SEQ ID NO: 517, SEQ ID NO: 523, SEQ ID NO: 529, SEQ ID NO: 535, SEQ ID NO: 541, SEQ ID NO: 547, SEQ ID NO: 553, SEQ ID NO: 559, SEQ ID NO: 565, SEQ ID NO: 571, SEQ ID NO: 577, SEQ ID NO: 583, SEQ ID NO: 589, SEQ ID NO: 595, SEQ ID NO: 601, SEQ ID NO: 607, SEQ ID NO: 613, SEQ ID NO: 619, SEQ ID NO: 625, SEQ ID NO: 631, SEQ ID NO: 637, SEQ ID NO: 643, SEQ ID NO: 649, SEQ ID NO: 655, SEQ ID NO: 661, SEQ ID NO: 667, SEQ ID NO: 673, SEQ ID NO: 679, SEQ ID NO: 685, SEQ ID NO: 691, SEQ ID NO: 697, SEQ ID NO: 703, SEQ ID NO: 709, SEQ ID NO: 715, SEQ ID NO: 721, SEQ ID NO: 727, SEQ ID NO: 733, SEQ ID NO: 739, SEQ ID NO: 745, SEQ ID NO: 751, SEQ ID NO: 757, SEQ ID NO: 763, SEQ ID NO: 769, SEQ ID NO: 775, SEQ ID NO: 781, SEQ ID NO: 787, SEQ ID NO: 793, SEQ ID NO: 799, SEQ ID NO: 805, SEQ ID NO: 811, SEQ ID NO: 817, SEQ ID NO: 823, SEQ ID NO: 829, SEQ ID NO: 835, SEQ ID NO: 841, SEQ ID NO: 847, SEQ ID NO: 853, SEQ ID NO: 859, SEQ ID NO: 865, SEQ ID NO: 871, SEQ ID NO: 877, SEQ ID NO: 883, SEQ ID NO: 889, SEQ ID NO: 895, SEQ ID NO: 901, SEQ ID NO: 907, SEQ ID NO: 913, SEQ ID NO: 919, SEQ ID NO: 925, SEQ ID NO: 931, SEQ ID NO: 937, SEQ ID NO: 943, SEQ ID NO: 949, SEQ ID NO: 955, SEQ ID NO: 961, SEQ ID NO: 967, SEQ ID NO: 973, SEQ ID NO: 979, SEQ ID NO: 985, SEQ ID NO: 991, SEQ ID NO: 997, SEQ ID NO: 1003, SEQ ID NO: 1009, SEQ ID NO: 1015, SEQ ID NO: 1021, SEQ ID NO: 1027, SEQ ID NO: 1033, SEQ ID NO: 1039, SEQ ID NO: 1045, SEQ ID NO: 1051, SEQ ID NO: 1057, SEQ ID NO: 1063, SEQ ID NO: 1069, SEQ ID NO: 1075, SEQ ID NO: 1081, SEQ ID NO: 1087, SEQ ID NO: 1093, SEQ ID NO: 1099, SEQ ID NO: 1105, SEQ ID NO: 1111, SEQ ID NO: 1117, SEQ ID NO: 1123, SEQ ID NO: 1129, SEQ ID NO: 1135, SEQ ID NO: 1141, SEQ ID NO: 1147, SEQ ID NO: 1153, SEQ ID NO: 1159, SEQ ID NO: 1165, SEQ ID NO: 1171, SEQ ID NO: 1177, SEQ ID NO: 1183, SEQ ID NO: 1189, SEQ ID NO: 1195, SEQ ID NO: 1201, SEQ ID NO: 1207, SEQ ID NO: 1213, SEQ ID NO: 1219, SEQ ID NO: 1225, SEQ ID NO: 1231, SEQ ID NO: 1237, SEQ ID NO: 1243, SEQ ID NO: 1249, SEQ ID

NO: 1255, SEQ ID NO: 1261, SEQ ID NO: 1267, SEQ ID NO: 1273, SEQ ID NO: 1279, SEQ ID NO: 1285, SEQ ID NO: 1291, SEQ ID NO: 1297, SEQ ID NO: 1303, SEQ ID NO: 1309, SEQ ID NO: 1315, SEQ ID NO: 1321, SEQ ID NO: 1327, SEQ ID NO: 1333, SEQ ID NO: 1339, SEQ ID NO: 1345, SEQ ID NO: 1351, SEQ ID NO: 1357, SEQ ID NO: 1363, SEQ ID NO: 1369, SEQ ID NO: 1375, SEQ ID NO: 1381, SEQ ID NO: 1387, SEQ ID NO: 1393, SEQ ID NO: 1399, SEQ ID NO: 1405, SEQ ID NO: 1411, SEQ ID NO: 1417, SEQ ID NO: 1423, SEQ ID NO: 1429, SEQ ID NO: 1435, SEQ ID NO: 1441, SEQ ID NO: 1447, SEQ ID NO: 1453, SEQ ID NO: 1459, SEQ ID NO: 1465, SEQ ID NO: 1471, SEQ ID NO: 1477, SEQ ID NO: 1483, SEQ ID NO: 1489, SEQ ID NO: 1495, SEQ ID NO: 1501, SEQ ID NO: 1507, SEQ ID NO: 1513, SEQ ID NO: 1519, SEQ ID NO: 1593, SEQ ID NO: 1525 SEQ ID NO: 1531, SEQ ID NO: 1537, SEQ ID NO: 1543, SEQ ID NO: 1549, SEQ ID NO: 1555, SEQ ID NO: 1561, SEQ ID NO: 1567, SEQ ID NO: 1573, SEQ ID NO: 1579, or SEQ ID NO: 1585 in Figure 3A, 3B, or 3C;

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NO: 1496, SEQ ID NO: 1502, SEQ ID NO: 1508, SEQ ID NO: 1514, SEQ ID NO: 1520, SEQ ID NO: 1594, SEQ ID NO: 1526, SEQ ID NO: 1532, SEQ ID NO: 1538, SEQ ID NO: 1544, SEQ ID NO: 1550, SEQ ID NO: 1556, SEQ ID NO: 1562, SEQ ID NO: 1568, SEQ ID NO: 1574, SEQ ID NO: 1580, or SEQ ID NO: 1586 in Figure 3A, 3B, or 3C;

(c) a heavy chain CDR3 comprising the amino acid sequence of any one of the HCDR3s in SEQ ID NO: 399, SEQ ID NO: 405, SEQ ID NO: 411, SEQ ID NO: 417, SEQ ID NO: 423, SEQ ID NO: 429, SEQ ID NO: 435, SEQ ID NO: 441, SEQ ID NO: 447, SEQ ID NO: 453, SEQ ID NO: 459, SEQ ID NO: 465, SEQ ID NO: 471, SEQ ID NO: 477, SEQ ID NO: 483, SEQ ID NO: 489, SEQ ID NO: 495, SEQ ID NO: 501, SEQ ID NO: 507, SEQ ID NO: 513, SEQ ID NO: 519, SEQ ID NO: 525, SEQ ID NO: 531, SEQ ID NO: 537, SEQ ID NO: 543, SEQ ID NO: 549, SEQ ID NO: 555, SEQ ID NO: 561, SEQ ID NO: 567, SEQ ID NO: 573, SEQ ID NO: 579, SEQ ID NO: 585, SEQ ID NO: 591, SEQ ID NO: 597, SEQ ID NO: 603, SEQ ID NO: 609, SEQ ID NO: 615, SEQ ID NO: 621, SEQ ID NO: 627, SEQ ID NO: 633, SEQ ID NO: 639, SEQ ID NO: 645, SEQ ID NO: 651, SEQ ID NO: 657, SEQ ID NO: 663, SEQ ID NO: 669, SEQ ID NO: 675, SEQ ID NO: 681, SEQ ID NO: 687, SEQ ID NO: 693, SEQ ID NO: 699, SEQ ID NO: 705, SEQ ID NO: 711, SEQ ID NO: 717, SEQ ID NO: 723, SEQ ID NO: 729, SEQ ID NO: 735, SEQ ID NO: 741, SEQ ID NO: 747, SEQ ID NO: 753, SEQ ID NO: 759, SEQ ID NO: 765, SEQ ID NO: 771, SEQ ID NO: 777, SEQ ID NO: 783, SEQ ID NO: 789, SEQ ID NO: 795, SEQ ID NO: 801, SEQ ID NO: 807, SEQ ID NO: 813, SEQ ID NO: 819, SEQ ID NO: 825, SEQ ID NO: 831, SEQ ID NO: 837, SEQ ID NO: 843, SEQ ID NO: 849, SEQ ID NO: 855, SEQ ID NO: 861, SEQ ID NO: 867, SEQ ID NO: 873, SEQ ID NO: 879, SEQ ID NO: 885, SEQ ID NO: 891, SEQ ID NO: 897, SEQ ID NO: 903, SEQ ID NO: 909, SEQ ID NO: 915, SEQ ID NO: 921, SEQ ID NO: 927, SEQ ID NO: 933, SEQ ID NO: 939, SEQ ID NO: 945, SEQ ID NO: 951, SEQ ID NO: 957, SEQ ID NO: 963, SEQ ID NO: 969, SEQ ID NO: 975, SEQ ID NO: 981, SEQ ID NO: 987, SEQ ID NO: 993, SEQ ID NO: 999, SEQ ID NO: 1005, SEQ ID NO: 1011, SEQ

ID NO: 1017, SEQ ID NO: 1023, SEQ ID NO: 1029, SEQ ID NO: 1035, SEQ ID NO: 1041, SEQ ID NO: 1047, SEQ ID NO: 1053, SEQ ID NO: 1059, SEQ ID NO: 1065, SEQ ID NO: 1071, SEQ ID NO: 1077, SEQ ID NO: 1083, SEQ ID NO: 1089, SEQ ID NO: 1095, SEQ ID NO: 1101, SEQ ID NO: 1107, SEQ ID NO: 1113, SEQ ID NO: 1119, SEQ ID NO: 1125, SEQ ID NO: 1131, SEQ ID NO: 1137, SEQ ID NO: 1143, SEQ ID NO: 1149, SEQ ID NO: 1155, SEQ ID NO: 1161, SEQ ID NO: 1167, SEQ ID NO: 1173, SEQ ID NO: 1179, SEQ ID NO: 1185, SEQ ID NO: 1191, SEQ ID NO: 1197, SEQ ID NO: 1203, SEQ ID NO: 1209, SEQ ID NO: 1215, SEQ ID NO: 1221, SEQ ID NO: 1227, SEQ ID NO: 1233, SEQ ID NO: 1239, SEQ ID NO: 1245, SEQ ID NO: 1251, SEQ ID NO: 1257, SEQ ID NO: 1263, SEQ ID NO: 1269, SEQ ID NO: 1275, SEQ ID NO: 1281, SEQ ID NO: 1287, SEQ ID NO: 1293, SEQ ID NO: 1299, SEQ ID NO: 1305, SEQ ID NO: 1311, SEQ ID NO: 1317, SEQ ID NO: 1323, SEQ ID NO: 1329, SEQ ID NO: 1335, SEQ ID NO: 1341, SEQ ID NO: 1347, SEQ ID NO: 1353, SEQ ID NO: 1359, SEQ ID NO: 1365, SEQ ID NO: 1371, SEQ ID NO: 1377, SEQ ID NO: 1383, SEQ ID NO: 1389, SEQ ID NO: 1395, SEQ ID NO: 1401, SEQ ID NO: 1407, SEQ ID NO: 1413, SEQ ID NO: 1419, SEQ ID NO: 1425, SEQ ID NO: 1431, SEQ ID NO: 1437, SEQ ID NO: 1443, SEQ ID NO: 1449, SEQ ID NO: 1455, SEQ ID NO: 1461, SEQ ID NO: 1467, SEQ ID NO: 1473, SEQ ID NO: 1479, SEQ ID NO: 1485, SEQ ID NO: 1491, SEQ ID NO: 1497, SEQ ID NO: 1503, SEQ ID NO: 1509, SEQ ID NO: 1515, SEQ ID NO: 1521, SEQ ID NO: 1595, SEQ ID NO: 1527, SEQ ID NO: 1533, SEQ ID NO: 1539, SEQ ID NO: 1545, SEQ ID NO: 1551, SEQ ID NO: 1557, SEQ ID NO: 1563, SEQ ID NO: 1569, SEQ ID NO: 1575, SEQ ID NO: 1581, or SEQ ID NO: 1587 in Figure 3A, 3B, or 3C;

(d) a light chain CDR1 comprising the amino acid sequence of any one of the LCDR1s in SEQ ID NO: 400, SEQ ID NO: 406, SEQ ID NO: 412, SEQ ID NO: 418, SEQ ID NO: 424, SEQ ID NO: 430, SEQ ID NO: 436, SEQ ID NO: 442, SEQ ID NO: 448, SEQ ID NO: 454, SEQ ID NO: 460, SEQ ID NO: 466, SEQ ID NO: 472, SEQ ID NO: 478, SEQ ID NO: 484, SEQ ID NO: 490, SEQ ID NO:

496, SEQ ID NO: 502, SEQ ID NO: 508, SEQ ID NO: 514, SEQ ID NO: 520, SEQ ID NO: 526, SEQ ID NO: 532, SEQ ID NO: 538, SEQ ID NO: 544, SEQ ID NO: 550, SEQ ID NO: 556, SEQ ID NO: 562, SEQ ID NO: 568, SEQ ID NO: 574, SEQ ID NO: 580, SEQ ID NO: 586, SEQ ID NO: 592, SEQ ID NO: 598, SEQ ID NO: 604, SEQ ID NO: 610, SEQ ID NO: 616, SEQ ID NO: 622, SEQ ID NO: 628, SEQ ID NO: 634, SEQ ID NO: 640, SEQ ID NO: 646, SEQ ID NO: 652, SEQ ID NO: 658, SEQ ID NO: 664, SEQ ID NO: 670, SEQ ID NO: 676, SEQ ID NO: 682, SEQ ID NO: 688, SEQ ID NO: 694, SEQ ID NO: 700, SEQ ID NO: 706, SEQ ID NO: 712, SEQ ID NO: 718, SEQ ID NO: 724, SEQ ID NO: 730, SEQ ID NO: 736, SEQ ID NO: 742, SEQ ID NO: 748, SEQ ID NO: 754, SEQ ID NO: 760, SEQ ID NO: 766, SEQ ID NO: 772, SEQ ID NO: 778, SEQ ID NO: 784, SEQ ID NO: 790, SEQ ID NO: 796, SEQ ID NO: 802, SEQ ID NO: 808, SEQ ID NO: 814, SEQ ID NO: 820, SEQ ID NO: 826, SEQ ID NO: 832, SEQ ID NO: 838, SEQ ID NO: 844, SEQ ID NO: 850, SEQ ID NO: 856, SEQ ID NO: 862, SEQ ID NO: 868, SEQ ID NO: 874, SEQ ID NO: 880, SEQ ID NO: 886, SEQ ID NO: 892, SEQ ID NO: 898, SEQ ID NO: 904, SEQ ID NO: 910, SEQ ID NO: 916, SEQ ID NO: 922, SEQ ID NO: 928, SEQ ID NO: 934, SEQ ID NO: 940, SEQ ID NO: 946, SEQ ID NO: 952, SEQ ID NO: 958, SEQ ID NO: 964, SEQ ID NO: 970, SEQ ID NO: 976, SEQ ID NO: 982, SEQ ID NO: 988, SEQ ID NO: 994, SEQ ID NO: 1000, SEQ ID NO: 1006, SEQ ID NO: 1012, SEQ ID NO: 1018, SEQ ID NO: 1024, SEQ ID NO: 1030, SEQ ID NO: 1036, SEQ ID NO: 1042, SEQ ID NO: 1048, SEQ ID NO: 1054, SEQ ID NO: 1060, SEQ ID NO: 1066, SEQ ID NO: 1072, SEQ ID NO: 1078, SEQ ID NO: 1084, SEQ ID NO: 1090, SEQ ID NO: 1096, SEQ ID NO: 1102, SEQ ID NO: 1108, SEQ ID NO: 1114, SEQ ID NO: 1120, SEQ ID NO: 1126, SEQ ID NO: 1132, SEQ ID NO: 1138, SEQ ID NO: 1144, SEQ ID NO: 1150, SEQ ID NO: 1156, SEQ ID NO: 1162, SEQ ID NO: 1168, SEQ ID NO: 1174, SEQ ID NO: 1180, SEQ ID NO: 1186, SEQ ID NO: 1192, SEQ ID NO: 1198, SEQ ID NO: 1204, SEQ ID NO: 1210, SEQ ID NO: 1216, SEQ ID NO: 1222, SEQ ID NO: 1228, SEQ ID NO: 1234, SEQ ID NO: 1240, SEQ ID NO: 1246, SEQ ID NO: 1252, SEQ ID

NO: 1258, SEQ ID NO: 1264, SEQ ID NO: 1270, SEQ ID NO: 1276, SEQ ID NO: 1282, SEQ ID NO: 1288, SEQ ID NO: 1294, SEQ ID NO: 1300, SEQ ID NO: 1306, SEQ ID NO: 1312, SEQ ID NO: 1318, SEQ ID NO: 1324, SEQ ID NO: 1330, SEQ ID NO: 1336, SEQ ID NO: 1342, SEQ ID NO: 1348, SEQ ID NO: 1354, SEQ ID NO: 1360, SEQ ID NO: 1366, SEQ ID NO: 1372, SEQ ID NO: 1378, SEQ ID NO: 1384, SEQ ID NO: 1390, SEQ ID NO: 1396, SEQ ID NO: 1402, SEQ ID NO: 1408, SEQ ID NO: 1414, SEQ ID NO: 1420, SEQ ID NO: 1426, SEQ ID NO: 1432, SEQ ID NO: 1438, SEQ ID NO: 1444, SEQ ID NO: 1450. SEQ ID NO: 1456, SEQ ID NO: 1462, SEQ ID NO: 1468, SEQ ID NO: 1474, SEQ ID NO: 1480, SEQ ID NO: 1486, SEQ ID NO: 1492, SEQ ID NO: 1498, SEQ ID NO: 1504, SEQ ID NO: 1510, SEQ ID NO: 1516, SEQ ID NO: 1522, SEQ ID NO: 1596, SEQ ID NO: 1528, SEQ ID NO: 1534, SEQ ID NO: 1540, SEQ ID NO: 1546, SEQ ID NO: 1552, SEQ ID NO: 1558, SEQ ID NO: 1564, SEQ ID NO: 1570, SEQ ID NO: 1576, SEQ ID NO: 1582, or SEQ ID NO: 1588 in Figure 3A, 3B, or 3C;

(e) a light chain CDR2 comprising the amino acid sequence of any one of the LCDR2s in SEQ ID NO: 401, SEQ ID NO: 407, SEQ ID NO: 413, SEQ ID NO: 419, SEQ ID NO: 425, SEQ ID NO: 431, SEQ ID NO: 437, SEQ ID NO: 443, SEQ ID NO: 449, SEQ ID NO: 455, SEQ ID NO: 461, SEQ ID NO: 467, SEQ ID NO: 473, SEQ ID NO: 479, SEQ ID NO: 485, SEQ ID NO: 491, SEQ ID NO: 497, SEQ ID NO: 503, SEQ ID NO: 509, SEQ ID NO: 515, SEQ ID NO: 521, SEQ ID NO: 527, SEQ ID NO: 533, SEQ ID NO: 539, SEQ ID NO: 545, SEQ ID NO: 551, SEQ ID NO: 557, SEQ ID NO: 563, SEQ ID NO: 569, SEQ ID NO: 575, SEQ ID NO: 581, SEQ ID NO: 587, SEQ ID NO: 593, SEQ ID NO: 599, SEQ ID NO: 605, SEQ ID NO: 611, SEQ ID NO: 617, SEQ ID NO: 623, SEQ ID NO: 629, SEQ ID NO: 635, SEQ ID NO: 641, SEQ ID NO: 647, SEQ ID NO: 653, SEQ ID NO: 659, SEQ ID NO: 665, SEQ ID NO: 671, SEQ ID NO: 677, SEQ ID NO: 683, SEQ ID NO: 689, SEQ ID NO: 695, SEQ ID NO: 701, SEQ ID NO: 707, SEQ ID NO: 713, SEQ ID NO: 719, SEQ ID NO: 725, SEQ ID NO: 731, SEQ ID NO: 737, SEQ ID NO: 743, SEQ ID NO: 749, SEQ ID NO: 755,

SEQ ID NO: 761, SEQ ID NO: 767, SEQ ID NO: 773, SEQ ID NO: 779, SEQ ID NO: 785, SEQ ID NO: 791, SEQ ID NO: 797, SEQ ID NO: 803, SEQ ID NO: 809, SEQ ID NO: 815, SEQ ID NO: 821, SEQ ID NO: 827, SEQ ID NO: 833, SEQ ID NO: 839, SEQ ID NO: 845, SEQ ID NO: 851, SEQ ID NO: 857, SEQ ID NO: 863, SEQ ID NO: 869, SEQ ID NO: 875, SEQ ID NO: 881, SEQ ID NO: 887, SEQ ID NO: 893, SEQ ID NO: 899, SEQ ID NO: 905, SEQ ID NO: 911, SEQ ID NO: 917, SEQ ID NO: 923, SEQ ID NO: 929, SEQ ID NO: 935, SEQ ID NO: 941, SEQ ID NO: 947, SEQ ID NO: 953, SEQ ID NO: 959, SEQ ID NO: 965, SEQ ID NO: 971, SEQ ID NO: 977, SEQ ID NO: 983, SEQ ID NO: 989, SEQ ID NO: 995, SEQ ID NO: 1001, SEQ ID NO: 1007, SEQ ID NO: 1013, SEQ ID NO: 1019, SEQ ID NO: 1025, SEQ ID NO: 1031, SEQ ID NO: 1037, SEQ ID NO: 1043, SEQ ID NO: 1049, SEQ ID NO: 1055, SEQ ID NO: 1061, SEQ ID NO: 1067, SEQ ID NO: 1073, SEQ ID NO: 1079, SEQ ID NO: 1085, SEQ ID NO: 1091, SEQ ID NO: 1097, SEQ ID NO: 1103, SEQ ID NO: 1109, SEQ ID NO: 1115, SEQ ID NO: 1121, SEQ ID NO: 1127, SEQ ID NO: 1133, SEQ ID NO: 1139, SEQ ID NO: 1145, SEQ ID NO: 1151, SEQ ID NO: 1157, SEQ ID NO: 1163, SEQ ID NO: 1169, SEQ ID NO: 1175, SEQ ID NO: 1181, SEQ ID NO: 1187, SEQ ID NO: 1193, SEQ ID NO: 1199, SEQ ID NO: 1205, SEQ ID NO: 1211, SEQ ID NO: 1217, SEQ ID NO: 1223, SEQ ID NO: 1229, SEQ ID NO: 1235, SEQ ID NO: 1241, SEQ ID NO: 1247, SEQ ID NO: 1253, SEQ ID NO: 1259, SEQ ID NO: 1265, SEQ ID NO: 1271, SEQ ID NO: 1277, SEQ ID NO: 1283, SEQ ID NO: 1289, SEQ ID NO: 1295, SEQ ID NO: 1301, SEQ ID NO: 1307, SEQ ID NO: 1313, SEQ ID NO: 1319, SEQ ID NO: 1325, SEQ ID NO: 1331, SEQ ID NO: 1337, SEQ ID NO: 1343, SEQ ID NO: 1349, SEQ ID NO: 1355, SEQ ID NO: 1361, SEQ ID NO: 1367, SEQ ID NO: 1373, SEQ ID NO: 1379, SEQ ID NO: 1385, SEQ ID NO: 1391, SEQ ID NO: 1397, SEQ ID NO: 1403, SEQ ID NO: 1409, SEQ ID NO: 1415, SEQ ID NO: 1421, SEQ ID NO: 1427, SEQ ID NO: 1433, SEQ ID NO: 1439, SEQ ID NO: 1445, SEQ ID NO: 1451, SEQ ID NO: 1457, SEQ ID NO: 1463, SEQ ID NO: 1469, SEQ ID NO: 1475, SEQ ID NO: 1481, SEQ ID NO: 1487, SEQ ID NO: 1493, SEQ ID

NO: 1499, SEQ ID NO: 1505, SEQ ID NO: 1511, SEQ ID NO: 1517, SEQ ID NO: 1523, SEQ ID NO: 1597, SEQ ID NO: 1529, SEQ ID NO: 1535, SEQ ID NO: 1541, SEQ ID NO: 1547, SEQ ID NO: 1553, SEQ ID NO: 1559, SEQ ID NO: 1565, SEQ ID NO: 1571, SEQ ID NO: 1577, SEQ ID NO: 1583, or SEQ ID NO: 1589 in Figure 3A, 3B, or 3C; and

(f) a light chain CDR3 comprising the amino acid sequence of any one of the LCDR3s in SEQ ID NO: 402, SEQ ID NO: 408, SEQ ID NO: 414, SEQ ID NO: 420, SEQ ID NO: 426, SEQ ID NO: 432, SEQ ID NO: 438, SEQ ID NO: 444, SEQ ID NO: 450, SEQ ID NO: 456, SEQ ID NO: 462, SEQ ID NO: 468, SEQ ID NO: 474, SEQ ID NO: 480, SEQ ID NO: 486, SEQ ID NO: 492, SEQ ID NO: 498, SEQ ID NO: 504, SEQ ID NO: 510, SEQ ID NO: 516, SEQ ID NO: 522, SEQ ID NO: 528, SEQ ID NO: 534, SEQ ID NO: 540, SEQ ID NO: 546, SEQ ID NO: 552, SEQ ID NO: 558, SEQ ID NO: 564, SEQ ID NO: 570, SEQ ID NO: 576, SEQ ID NO: 582, SEQ ID NO: 588, SEQ ID NO: 594, SEQ ID NO: 600, SEQ ID NO: 606, SEQ ID NO: 612, SEQ ID NO: 618, SEQ ID NO: 624, SEQ ID NO: 630, SEQ ID NO: 636, SEQ ID NO: 642, SEQ ID NO: 648, SEQ ID NO: 654, SEQ ID NO: 660, SEQ ID NO: 666, SEQ ID NO: 672, SEQ ID NO: 678, SEQ ID NO: 684, SEQ ID NO: 690, SEQ ID NO: 696, SEQ ID NO: 702, SEQ ID NO: 708, SEQ ID NO: 714, SEQ ID NO: 720, SEQ ID NO: 726, SEQ ID NO: 732, SEQ ID NO: 738, SEQ ID NO: 744, SEQ ID NO: 750, SEQ ID NO: 756, SEQ ID NO: 762, SEQ ID NO: 768, SEQ ID NO: 774, SEQ ID NO: 780, SEQ ID NO: 786, SEQ ID NO: 792, SEQ ID NO: 798, SEQ ID NO: 804, SEQ ID NO: 810, SEQ ID NO: 816, SEQ ID NO: 822, SEQ ID NO: 828, SEQ ID NO: 834, SEQ ID NO: 840, SEQ ID NO: 846, SEQ ID NO: 852, SEQ ID NO: 858, SEQ ID NO: 864, SEQ ID NO: 870, SEQ ID NO: 876, SEQ ID NO: 882, SEQ ID NO: 888, SEQ ID NO: 894, SEQ ID NO: 900, SEQ ID NO: 906, SEQ ID NO: 912, SEQ ID NO: 918, SEQ ID NO: 924, SEQ ID NO: 930, SEQ ID NO: 936, SEQ ID NO: 942, SEQ ID NO: 948, SEQ ID NO: 954, SEQ ID NO: 960, SEQ ID NO: 966, SEQ ID NO: 972, SEQ ID NO: 978, SEQ ID NO: 984, SEQ ID NO: 990, SEQ ID NO: 996, SEQ ID NO: 1002, SEQ ID NO: 1008, SEQ ID NO: 1014, SEQ

ID NO: 1020, SEQ ID NO: 1026, SEQ ID NO: 1032, SEQ ID NO: 1038, SEQ ID NO: 1044, SEQ ID NO: 1050, SEQ ID NO: 1056, SEQ ID NO: 1062, SEQ ID NO: 1068, SEQ ID NO: 1074, SEQ ID NO: 1080, SEQ ID NO: 1086, SEQ ID NO: 1092, SEQ ID NO: 1098, SEQ ID NO: 1104, SEQ ID NO: 1110, SEQ ID NO: 1116, SEQ ID NO: 1122, SEQ ID NO: 1128, SEQ ID NO: 1134, SEQ ID NO: 1140, SEQ ID NO: 1146, SEQ ID NO: 1152, SEQ ID NO: 1158, SEQ ID NO: 1164, SEQ ID NO: 1170, SEQ ID NO: 1176, SEQ ID NO: 1182, SEQ ID NO: 1188, SEQ ID NO: 1194, SEQ ID NO: 1200, SEQ ID NO: 1206, SEQ ID NO: 1212, SEQ ID NO: 1218, SEQ ID NO: 1224, SEQ ID NO: 1230, SEQ ID NO: 1236, SEQ ID NO: 1242, SEQ ID NO: 1248, SEQ ID NO: 1254, SEQ ID NO: 1260, SEQ ID NO: 1266, SEQ ID NO: 1272, SEQ ID NO: 1278, SEQ ID NO: 1284, SEQ ID NO: 1290, SEQ ID NO: 1296, SEQ ID NO: 1302, SEQ ID NO: 1308, SEQ ID NO: 1314, SEQ ID NO: 1320, SEQ ID NO: 1326, SEQ ID NO: 1332, SEQ ID NO: 1338, SEQ ID NO: 1344, SEQ ID NO: 1350, SEQ ID NO: 1356, SEQ ID NO: 1362, SEQ ID NO: 1368, SEQ ID NO: 1374, SEQ ID NO: 1380, SEQ ID NO: 1386, SEQ ID NO: 1392, SEQ ID NO: 1398, SEQ ID NO: 1404, SEQ ID NO: 1410, SEQ ID NO: 1416, SEQ ID NO: 1422, SEQ ID NO: 1428, SEQ ID NO: 1434, SEQ ID NO: 1440, SEQ ID NO: 1446, SEQ ID NO: 1452, SEQ ID NO: 1458, SEQ ID NO: 1464, SEQ ID NO: 1470, SEQ ID NO: 1476, SEQ ID NO: 1482, SEQ ID NO: 1488, SEQ ID NO: 1494, SEQ ID NO: 1500, SEQ ID NO: 1506, SEQ ID NO: 1512, SEQ ID NO: 1518, SEQ ID NO: 1524, SEQ ID NO: 1598, SEQ ID NO: 1530, SEQ ID NO: 1536, SEQ ID NO: 1542, SEQ ID NO: 1548, SEQ ID NO: 1554, SEQ ID NO: 1560, SEQ ID NO: 1566, SEQ ID NO: 1572, SEQ ID NO: 1578, SEQ ID NO: 1584, or SEQ ID NO: 1590 in Figure 3A, 3B, or 3C,

wherein the HCDR1, HCDR2, HCDR3, LCDR1, LCDR2, and LCDR3 are from a same clone.

6. An isolated antigen binding molecule that binds to human TIGIT, wherein the isolated antigen binding molecule comprises a heavy chain comprising the heavy chain amino acid variable sequence in any one of SEQ ID NO. 1 – SEQ ID NO: 97, SEQ ID NO:

195 – SEQ ID NO: 209, or SEQ ID NO: 225 – SEQ ID NO: 310 in Figures 2A, 2B, or 2C.

7. An isolated antigen binding molecule that binds to human TIGIT, wherein the isolated antigen binding molecule comprises a light chain comprising the light chain amino acid variable sequence in any one of SEQ ID NO: 98 – SEQ ID NO: 194, SEQ ID NO: 210 – SEQ ID NO: 224, or SEQ ID NO: 311 – SEQ ID NO: 396 in Figures 2A, 2B, or 2C.
8. An isolated antigen binding molecule that binds to human TIGIT, wherein the isolated antigen binding molecule comprises a heavy chain comprising the heavy chain amino acid variable sequence in any one of SEQ ID NO. 1 – SEQ ID NO: 97, SEQ ID NO: 195 – SEQ ID NO: 209, or SEQ ID NO: 225 – SEQ ID NO: 310 in Figures 2A, 2B, or 2C and a light chain comprising the light chain amino acid variable sequence in any one of SEQ ID NO: 98 – SEQ ID NO: 194, SEQ ID NO: 210 – SEQ ID NO: 224, or SEQ ID NO: 311 – SEQ ID NO: 396 in Figures 2A, 2B, or 2C.
9. An isolated antigen binding molecule that binds to human TIGIT, wherein the isolated antigen binding molecule comprises

a heavy chain CDR1 comprising $SSYX_4MX_6$ (SEQ ID NO: 1600)

wherein

X_4 is A, G, or S and

X_6 is H, N, or S;

a heavy chain CDR2 comprising $WVY_3Y_4IY_6Y_7Y_8Y_9Y_{10}Y_{11}Y_{12}Y_{13}$ (SEQ ID NO: 1601)

wherein

Y_3 is S or A

Y_4 is G, N, S, Y, or A

Y_6 is S, K, or N

Y_7 is S, Y, or G

Y_8 is N or S

Y_9 is G, S, A, or T

Y_{10} is G or S

Y_{11} is S, N, or T

Y_{12} is T, K, S, or I

Y_{13} is S, Y, or G; and

a heavy chain CDR3 comprising $ARZ_3PYZ_6Z_7WZ_9D$ (SEQ ID NO:1602)

wherein

Z_3 is V, A, G, or E

Z_6 is S, D, or G

Z_7 is V or Y

Z_9 is I, A, M, or L.

10. An isolated binding molecule that binds to human TIGIT, wherein the isolated antigen binding molecule comprises at least one of:

(a) (i) a heavy chain variable region comprising the amino acid sequence of SEQ ID NO: 23 and

(ii) a light chain variable region comprising the amino acid sequence of SEQ ID NO: 120;

(b) (i) a heavy chain variable region comprising the amino acid sequence of SEQ ID NO: 29 and

(ii) a light chain variable region comprising the amino acid sequence of SEQ ID NO: 126;

(c) (i) a heavy chain variable region comprising the amino acid sequence of SEQ ID NO: 45 and

(ii) a light chain variable region comprising the amino acid sequence of SEQ ID NO: 142;

(d) (i) a heavy chain variable region comprising the amino acid sequence of SEQ ID NO: 46 and

(ii) a light chain variable region comprising the amino acid sequence of SEQ ID NO: 143;

(e) (i) a heavy chain variable region comprising the amino acid sequence of SEQ ID NO: 58 and

(ii) a light chain variable region comprising the amino acid sequence of SEQ ID NO: 155;

(f) (i) a heavy chain variable region comprising the amino acid sequence of SEQ ID NO: 63 and

(ii) a light chain variable region comprising the amino acid sequence of SEQ ID NO: 160;

(g) (i) a heavy chain variable region comprising the amino acid sequence of SEQ ID NO: 67 and

(ii) a light chain variable region comprising the amino acid sequence of SEQ ID NO:164;

(h) (i) a heavy chain variable region comprising the amino acid sequence of SEQ ID NO: 72 and

(ii) a light chain variable region comprising the amino acid sequence of SEQ ID NO: 169;

(i) (i) a heavy chain variable region comprising the amino acid sequence of SEQ ID NO: 80 and

(ii) a light chain variable region comprising the amino acid sequence of SEQ ID NO: 177; or

(j) (i) a heavy chain variable region that is at least 85% identical to any of the heavy chain variable regions in (a)-(i) and

(ii) a light chain variable region that is at least 85% identical to any of the light chain variable regions in (a)-(i).

11. An isolated antigen binding molecule that binds to human TIGIT, wherein the isolated antigen binding molecule comprises a heavy chain CDR3 of contiguous amino acids $Z_1Z_2Z_3Z_4Z_5Z_6Z_7Z_8Z_9Z_{10}$, (SEQ ID NO: 1599) wherein

Z_1 is A;

Z_2 is R;

Z_3 is E;

Z_4 is P;

Z_5 is Y;

Z_6 is D, G, or S;

Z_7 is V, Y, or T;

Z_8 is W;

Z_9 is I, L, or M; and

Z_{10} is D.

12. The isolated antigen binding molecule of claim 11, wherein Z_6 is D.
13. The isolated antigen binding molecule of claim 11, wherein Z_6 is G.
14. The isolated antigen binding molecule of claim 11, wherein Z_6 is S.
15. The isolated antigen binding molecule of claim 11, wherein Z_7 is V.
16. The isolated antigen binding molecule of claim 11, wherein Z_7 is Y.
17. The isolated antigen binding molecule of claim 11, wherein Z_7 is T.
18. The isolated antigen binding molecule of claim 11, wherein Z_9 is I.
19. The isolated antigen binding molecule of claim 11, wherein Z_9 is L.
20. The isolated antigen binding molecule of claim 11, wherein Z_9 is M.
21. An isolated antibody that comprises:

(a) a heavy chain CDR1 comprising the amino acid sequence of any of one of the HCDR1s in SEQ ID NO: 397, SEQ ID NO: 403. SEQ ID NO: 409, SEQ ID NO: 415, SEQ ID NO: 421, SEQ ID NO: 427, SEQ ID NO: 433, SEQ ID NO: 439, SEQ ID NO: 445, SEQ ID NO: 451, SEQ ID NO: 457, SEQ ID NO: 463, SEQ ID NO: 469, SEQ ID NO: 475, SEQ ID NO: 481, SEQ ID NO: 487, SEQ ID NO: 493, SEQ ID NO: 499, SEQ ID NO: 505, SEQ ID NO: 511, SEQ ID NO: 517, SEQ ID NO: 523, SEQ ID NO: 529, SEQ ID NO: 535, SEQ ID NO: 541, SEQ ID NO: 547, SEQ ID NO: 553, SEQ ID NO: 559, SEQ ID NO: 565, SEQ ID NO: 571, SEQ ID NO: 577, SEQ ID NO: 583, SEQ ID NO: 589, SEQ ID NO: 595, SEQ ID NO: 601, SEQ ID NO: 607, SEQ ID NO: 613, SEQ ID NO: 619, SEQ ID NO: 625, SEQ ID NO: 631, SEQ ID NO: 637, SEQ ID NO: 643, SEQ ID NO: 649, SEQ ID NO: 655, SEQ ID NO: 661, SEQ ID NO: 667, SEQ ID NO: 673, SEQ ID NO: 679, SEQ ID NO: 685, SEQ ID NO: 691, SEQ ID NO: 697, SEQ ID NO: 703, SEQ ID NO: 709, SEQ ID NO: 715, SEQ ID NO: 721, SEQ ID NO: 727, SEQ ID NO: 733, SEQ ID NO: 739, SEQ ID NO: 745, SEQ ID NO: 751, SEQ ID NO: 757, SEQ ID NO: 763, SEQ ID

NO: 769, SEQ ID NO: 775, SEQ ID NO: 781, SEQ ID NO: 787, SEQ ID NO: 793, SEQ ID NO: 799, SEQ ID NO: 805, SEQ ID NO: 811, SEQ ID NO: 817, SEQ ID NO: 823, SEQ ID NO: 829, SEQ ID NO: 835, SEQ ID NO: 841, SEQ ID NO: 847, SEQ ID NO: 853, SEQ ID NO: 859, SEQ ID NO: 865, SEQ ID NO: 871, SEQ ID NO: 877, SEQ ID NO: 883, SEQ ID NO: 889, SEQ ID NO: 895, SEQ ID NO: 901, SEQ ID NO: 907, SEQ ID NO: 913, SEQ ID NO: 919, SEQ ID NO: 925, SEQ ID NO: 931, SEQ ID NO: 937, SEQ ID NO: 943, SEQ ID NO: 949, SEQ ID NO: 955, SEQ ID NO: 961, SEQ ID NO: 967, SEQ ID NO: 973, SEQ ID NO: 979, SEQ ID NO: 985, SEQ ID NO: 991, SEQ ID NO: 997, SEQ ID NO: 1003, SEQ ID NO: 1009, SEQ ID NO: 1015, SEQ ID NO: 1021, SEQ ID NO: 1027, SEQ ID NO: 1033, SEQ ID NO: 1039, SEQ ID NO: 1045, SEQ ID NO: 1051, SEQ ID NO: 1057, SEQ ID NO: 1063, SEQ ID NO: 1069, SEQ ID NO: 1075, SEQ ID NO: 1081, SEQ ID NO: 1087, SEQ ID NO: 1093, SEQ ID NO: 1099, SEQ ID NO: 1105, SEQ ID NO: 1111, SEQ ID NO: 1117, SEQ ID NO: 1123, SEQ ID NO: 1129, SEQ ID NO: 1135, SEQ ID NO: 1141, SEQ ID NO: 1147, SEQ ID NO: 1153, SEQ ID NO: 1159, SEQ ID NO: 1165, SEQ ID NO: 1171, SEQ ID NO: 1177, SEQ ID NO: 1183, SEQ ID NO: 1189, SEQ ID NO: 1195, SEQ ID NO: 1201, SEQ ID NO: 1207, SEQ ID NO: 1213, SEQ ID NO: 1219, SEQ ID NO: 1225, SEQ ID NO: 1231, SEQ ID NO: 1237, SEQ ID NO: 1243, SEQ ID NO: 1249, SEQ ID NO: 1255, SEQ ID NO: 1261, SEQ ID NO: 1267, SEQ ID NO: 1273, SEQ ID NO: 1279, SEQ ID NO: 1285, SEQ ID NO: 1291, SEQ ID NO: 1297, SEQ ID NO: 1303, SEQ ID NO: 1309, SEQ ID NO: 1315, SEQ ID NO: 1321, SEQ ID NO: 1327, SEQ ID NO: 1333, SEQ ID NO: 1339, SEQ ID NO: 1345, SEQ ID NO: 1351, SEQ ID NO: 1357, SEQ ID NO: 1363, SEQ ID NO: 1369, SEQ ID NO: 1375, SEQ ID NO: 1381, SEQ ID NO: 1387, SEQ ID NO: 1393, SEQ ID NO: 1399, SEQ ID NO: 1405, SEQ ID NO: 1411, SEQ ID NO: 1417, SEQ ID NO: 1423, SEQ ID NO: 1429, SEQ ID NO: 1435, SEQ ID NO: 1441, SEQ ID NO: 1447, SEQ ID NO: 1453, SEQ ID NO: 1459, SEQ ID NO: 1465, SEQ ID NO: 1471, SEQ ID NO: 1477, SEQ ID NO: 1483, SEQ ID NO: 1489, SEQ ID NO: 1495, SEQ ID NO: 1501, SEQ ID NO: 1507, SEQ ID NO: 1513, SEQ ID NO: 1519, SEQ ID NO: 1593, SEQ ID NO: 1525 SEQ ID NO: 1531, SEQ ID NO: 1537, SEQ ID

NO: 1543, SEQ ID NO: 1549, SEQ ID NO: 1555, SEQ ID NO: 1561, SEQ ID NO: 1567, SEQ ID NO: 1573, SEQ ID NO: 1579, or SEQ ID NO: 1585 in Figure 3A, 3B, or 3C;

(b) a heavy chain CDR2 comprising the amino acid sequence of any one of the HCDR2s in in SEQ ID NO: 398, SEQ ID NO: 404, SEQ ID NO: 410, SEQ ID NO: 416, SEQ ID NO: 422, SEQ ID NO: 428, SEQ ID NO: 434, SEQ ID NO: 440, SEQ ID NO: 446, SEQ ID NO: 452, SEQ ID NO: 458, SEQ ID NO: 464, SEQ ID NO: 470, SEQ ID NO: 476, SEQ ID NO: 482, SEQ ID NO: 488, SEQ ID NO: 494, SEQ ID NO: 500, SEQ ID NO: 506, SEQ ID NO: 512, SEQ ID NO: 518, SEQ ID NO: 524, SEQ ID NO: 530, SEQ ID NO: 536, SEQ ID NO: 542, SEQ ID NO: 548, SEQ ID NO: 554, SEQ ID NO: 560, SEQ ID NO: 566, SEQ ID NO: 572, SEQ ID NO: 578, SEQ ID NO: 584, SEQ ID NO: 590, SEQ ID NO: 596, SEQ ID NO: 602, SEQ ID NO: 608, SEQ ID NO: 614, SEQ ID NO: 620, SEQ ID NO: 626, SEQ ID NO: 632, SEQ ID NO: 638, SEQ ID NO: 644, SEQ ID NO: 650, SEQ ID NO: 656, SEQ ID NO: 662, SEQ ID NO: 668, SEQ ID NO: 674, SEQ ID NO: 680, SEQ ID NO: 686, SEQ ID NO: 692, SEQ ID NO: 698, SEQ ID NO: 704, SEQ ID NO: 710, SEQ ID NO: 716, SEQ ID NO: 722, SEQ ID NO: 728, SEQ ID NO: 734, SEQ ID NO: 740, SEQ ID NO: 746, SEQ ID NO: 752, SEQ ID NO: 758, SEQ ID NO: 764, SEQ ID NO: 770, SEQ ID NO: 776, SEQ ID NO: 782, SEQ ID NO: 788, SEQ ID NO: 794, SEQ ID NO: 800, SEQ ID NO: 806, SEQ ID NO: 812, SEQ ID NO: 818, SEQ ID NO: 824, SEQ ID NO: 830, SEQ ID NO: 836, SEQ ID NO: 842, SEQ ID NO: 848, SEQ ID NO: 854, SEQ ID NO: 860, SEQ ID NO: 866, SEQ ID NO: 872, SEQ ID NO: 878, SEQ ID NO: 884, SEQ ID NO: 890, SEQ ID NO: 896, SEQ ID NO: 902, SEQ ID NO: 908, SEQ ID NO: 914, SEQ ID NO: 920, SEQ ID NO: 926, SEQ ID NO: 932, SEQ ID NO: 938, SEQ ID NO: 944, SEQ ID NO: 950, SEQ ID NO: 956, SEQ ID NO: 962, SEQ ID NO: 968, SEQ ID NO: 974, SEQ ID NO: 980, SEQ ID NO: 986, SEQ ID NO: 992, SEQ ID NO: 998, SEQ ID NO: 1004, SEQ ID NO: 1010, SEQ ID NO: 1016, SEQ ID NO: 1022, SEQ ID NO: 1028, SEQ ID NO: 1034, SEQ ID NO: 1040, SEQ ID NO: 1046, SEQ ID NO: 1052, SEQ ID NO: 1058, SEQ ID NO: 1064, SEQ ID NO: 1070, SEQ ID NO: 1076, SEQ ID NO: 1082, SEQ ID NO: 1088, SEQ ID NO: 1094, SEQ ID NO: 1100, SEQ ID NO: 1106, SEQ ID NO: 1112, SEQ ID NO: 1118, SEQ ID NO: 1124, SEQ ID NO: 1130, SEQ ID NO: 1136, SEQ ID NO: 1142, SEQ ID NO: 1148, SEQ ID NO: 1154, SEQ ID

NO: 1160, SEQ ID NO: 1166, SEQ ID NO: 1172, SEQ ID NO: 1178, SEQ ID NO: 1184, SEQ ID NO: 1190, SEQ ID NO: 1196, SEQ ID NO: 1202, SEQ ID NO: 1208, SEQ ID NO: 1214, SEQ ID NO: 1220, SEQ ID NO: 1226, SEQ ID NO: 1232, SEQ ID NO: 1238, SEQ ID NO: 1244, SEQ ID NO: 1250, SEQ ID NO: 1256, SEQ ID NO: 1262, SEQ ID NO: 1268, SEQ ID NO: 1274, SEQ ID NO: 1280, SEQ ID NO: 1286, SEQ ID NO: 1292, SEQ ID NO: 1298, SEQ ID NO: 1304, SEQ ID NO: 1310, SEQ ID NO: 1316, SEQ ID NO: 1322, SEQ ID NO: 1328, SEQ ID NO: 1334, SEQ ID NO: 1340, SEQ ID NO: 1346, SEQ ID NO: 1352, SEQ ID NO: 1358, SEQ ID NO: 1364, SEQ ID NO: 1370, SEQ ID NO: 1376, SEQ ID NO: 1382, SEQ ID NO: 1388, SEQ ID NO: 1394, SEQ ID NO: 1400, SEQ ID NO: 1406, SEQ ID NO: 1412, SEQ ID NO: 1418, SEQ ID NO: 1424, SEQ ID NO: 1430, SEQ ID NO: 1436, SEQ ID NO: 1442, SEQ ID NO: 1448, SEQ ID NO: 1454, SEQ ID NO: 1460, SEQ ID NO: 1466, SEQ ID NO: 1472, SEQ ID NO: 1478, SEQ ID NO: 1484, SEQ ID NO: 1490, SEQ ID NO: 1496, SEQ ID NO: 1502, SEQ ID NO: 1508, SEQ ID NO: 1514, SEQ ID NO: 1520, SEQ ID NO: 1594, SEQ ID NO: 1526, SEQ ID NO: 1532, SEQ ID NO: 1538, SEQ ID NO: 1544, SEQ ID NO: 1550, SEQ ID NO: 1556, SEQ ID NO: 1562, SEQ ID NO: 1568, SEQ ID NO: 1574, SEQ ID NO: 1580, or SEQ ID NO: 1586 in Figure 3A, 3B, or 3C;

(c) a heavy chain CDR3 comprising the amino acid sequence of any one of the HCDR3s in SEQ ID NO: 399, SEQ ID NO: 405, SEQ ID NO: 411, SEQ ID NO: 417, SEQ ID NO: 423, SEQ ID NO: 429, SEQ ID NO: 435, SEQ ID NO: 441, SEQ ID NO: 447, SEQ ID NO: 453, SEQ ID NO: 459, SEQ ID NO: 465, SEQ ID NO: 471, SEQ ID NO: 477, SEQ ID NO: 483, SEQ ID NO: 489, SEQ ID NO: 495, SEQ ID NO: 501, SEQ ID NO: 507, SEQ ID NO: 513, SEQ ID NO: 519, SEQ ID NO: 525, SEQ ID NO: 531, SEQ ID NO: 537, SEQ ID NO: 543, SEQ ID NO: 549, SEQ ID NO: 555, SEQ ID NO: 561, SEQ ID NO: 567, SEQ ID NO: 573, SEQ ID NO: 579, SEQ ID NO: 585, SEQ ID NO: 591, SEQ ID NO: 597, SEQ ID NO: 603, SEQ ID NO: 609, SEQ ID NO: 615, SEQ ID NO: 621, SEQ ID NO: 627, SEQ ID NO: 633, SEQ ID NO: 639, SEQ ID NO: 645, SEQ ID NO: 651, SEQ ID NO: 657, SEQ ID NO: 663, SEQ ID NO: 669, SEQ ID NO: 675, SEQ ID NO: 681, SEQ ID NO: 687, SEQ ID NO: 693, SEQ ID NO: 699, SEQ ID NO: 705, SEQ ID NO: 711, SEQ ID NO: 717, SEQ ID NO: 723, SEQ ID NO: 729, SEQ ID NO: 735, SEQ ID NO: 741, SEQ ID NO: 747, SEQ ID NO: 753, SEQ ID NO: 759, SEQ ID NO: 765, SEQ ID NO: 771, SEQ ID NO: 777, SEQ

ID NO: 783, SEQ ID NO: 789, SEQ ID NO: 795, SEQ ID NO: 801, SEQ ID NO: 807, SEQ ID NO: 813, SEQ ID NO: 819, SEQ ID NO: 825, SEQ ID NO: 831, SEQ ID NO: 837, SEQ ID NO: 843, SEQ ID NO: 849, SEQ ID NO: 855, SEQ ID NO: 861, SEQ ID NO: 867, SEQ ID NO: 873, SEQ ID NO: 879, SEQ ID NO: 885, SEQ ID NO: 891, SEQ ID NO: 897, SEQ ID NO: 903, SEQ ID NO: 909, SEQ ID NO: 915, SEQ ID NO: 921, SEQ ID NO: 927, SEQ ID NO: 933, SEQ ID NO: 939, SEQ ID NO: 945, SEQ ID NO: 951, SEQ ID NO: 957, SEQ ID NO: 963, SEQ ID NO: 969, SEQ ID NO: 975, SEQ ID NO: 981, SEQ ID NO: 987, SEQ ID NO: 993, SEQ ID NO: 999, SEQ ID NO: 1005, SEQ ID NO: 1011, SEQ ID NO: 1017, SEQ ID NO: 1023, SEQ ID NO: 1029, SEQ ID NO: 1035, SEQ ID NO: 1041, SEQ ID NO: 1047, SEQ ID NO: 1053, SEQ ID NO: 1059, SEQ ID NO: 1065, SEQ ID NO: 1071, SEQ ID NO: 1077, SEQ ID NO: 1083, SEQ ID NO: 1089, SEQ ID NO: 1095, SEQ ID NO: 1101, SEQ ID NO: 1107, SEQ ID NO: 1113, SEQ ID NO: 1119, SEQ ID NO: 1125, SEQ ID NO: 1131, SEQ ID NO: 1137, SEQ ID NO: 1143, SEQ ID NO: 1149, SEQ ID NO: 1155, SEQ ID NO: 1161, SEQ ID NO: 1167, SEQ ID NO: 1173, SEQ ID NO: 1179, SEQ ID NO: 1185, SEQ ID NO: 1191, SEQ ID NO: 1197, SEQ ID NO: 1203, SEQ ID NO: 1209, SEQ ID NO: 1215, SEQ ID NO: 1221, SEQ ID NO: 1227, SEQ ID NO: 1233, SEQ ID NO: 1239, SEQ ID NO: 1245, SEQ ID NO: 1251, SEQ ID NO: 1257, SEQ ID NO: 1263, SEQ ID NO: 1269, SEQ ID NO: 1275, SEQ ID NO: 1281, SEQ ID NO: 1287, SEQ ID NO: 1293, SEQ ID NO: 1299, SEQ ID NO: 1305, SEQ ID NO: 1311, SEQ ID NO: 1317, SEQ ID NO: 1323, SEQ ID NO: 1329, SEQ ID NO: 1335, SEQ ID NO: 1341, SEQ ID NO: 1347, SEQ ID NO: 1353, SEQ ID NO: 1359, SEQ ID NO: 1365, SEQ ID NO: 1371, SEQ ID NO: 1377, SEQ ID NO: 1383, SEQ ID NO: 1389, SEQ ID NO: 1395, SEQ ID NO: 1401, SEQ ID NO: 1407, SEQ ID NO: 1413, SEQ ID NO: 1419, SEQ ID NO: 1425, SEQ ID NO: 1431, SEQ ID NO: 1437, SEQ ID NO: 1443, SEQ ID NO: 1449, SEQ ID NO: 1455, SEQ ID NO: 1461, SEQ ID NO: 1467, SEQ ID NO: 1473, SEQ ID NO: 1479, SEQ ID NO: 1485, SEQ ID NO: 1491, SEQ ID NO: 1497, SEQ ID NO: 1503, SEQ ID NO: 1509, SEQ ID NO: 1515, SEQ ID NO: 1521, SEQ ID NO: 1595, SEQ ID NO: 1527, SEQ ID NO: 1533, SEQ ID NO: 1539, SEQ ID NO: 1545, SEQ ID NO: 1551, SEQ ID NO: 1557, SEQ ID NO: 1563, SEQ ID NO: 1569, SEQ ID NO: 1575, SEQ ID NO: 1581, or SEQ ID NO: 1587 in Figure 3A, 3B, or 3C;

(d) a light chain CDR1 comprising the amino acid sequence of any one of the LCDR1s in SEQ ID NO: 400, SEQ ID NO: 406, SEQ ID NO: 412, SEQ ID NO: 418, SEQ ID NO: 424, SEQ ID NO: 430, SEQ ID NO: 436, SEQ ID NO: 442, SEQ ID NO: 448, SEQ ID NO: 454, SEQ ID NO: 460, SEQ ID NO: 466, SEQ ID NO: 472, SEQ ID NO: 478, SEQ ID NO: 484, SEQ ID NO: 490, SEQ ID NO: 496, SEQ ID NO: 502, SEQ ID NO: 508, SEQ ID NO: 514, SEQ ID NO: 520, SEQ ID NO: 526, SEQ ID NO: 532, SEQ ID NO: 538, SEQ ID NO: 544, SEQ ID NO: 550, SEQ ID NO: 556, SEQ ID NO: 562, SEQ ID NO: 568, SEQ ID NO: 574, SEQ ID NO: 580, SEQ ID NO: 586, SEQ ID NO: 592, SEQ ID NO: 598, SEQ ID NO: 604, SEQ ID NO: 610, SEQ ID NO: 616, SEQ ID NO: 622, SEQ ID NO: 628, SEQ ID NO: 634, SEQ ID NO: 640, SEQ ID NO: 646, SEQ ID NO: 652, SEQ ID NO: 658, SEQ ID NO: 664, SEQ ID NO: 670, SEQ ID NO: 676, SEQ ID NO: 682, SEQ ID NO: 688, SEQ ID NO: 694, SEQ ID NO: 700, SEQ ID NO: 706, SEQ ID NO: 712, SEQ ID NO: 718, SEQ ID NO: 724, SEQ ID NO: 730, SEQ ID NO: 736, SEQ ID NO: 742, SEQ ID NO: 748, SEQ ID NO: 754, SEQ ID NO: 760, SEQ ID NO: 766, SEQ ID NO: 772, SEQ ID NO: 778, SEQ ID NO: 784, SEQ ID NO: 790, SEQ ID NO: 796, SEQ ID NO: 802, SEQ ID NO: 808, SEQ ID NO: 814, SEQ ID NO: 820, SEQ ID NO: 826, SEQ ID NO: 832, SEQ ID NO: 838, SEQ ID NO: 844, SEQ ID NO: 850, SEQ ID NO: 856, SEQ ID NO: 862, SEQ ID NO: 868, SEQ ID NO: 874, SEQ ID NO: 880, SEQ ID NO: 886, SEQ ID NO: 892, SEQ ID NO: 898, SEQ ID NO: 904, SEQ ID NO: 910, SEQ ID NO: 916, SEQ ID NO: 922, SEQ ID NO: 928, SEQ ID NO: 934, SEQ ID NO: 940, SEQ ID NO: 946, SEQ ID NO: 952, SEQ ID NO: 958, SEQ ID NO: 964, SEQ ID NO: 970, SEQ ID NO: 976, SEQ ID NO: 982, SEQ ID NO: 988, SEQ ID NO: 994, SEQ ID NO: 1000, SEQ ID NO: 1006, SEQ ID NO: 1012, SEQ ID NO: 1018, SEQ ID NO: 1024, SEQ ID NO: 1030, SEQ ID NO: 1036, SEQ ID NO: 1042, SEQ ID NO: 1048, SEQ ID NO: 1054, SEQ ID NO: 1060, SEQ ID NO: 1066, SEQ ID NO: 1072, SEQ ID NO: 1078, SEQ ID NO: 1084, SEQ ID NO: 1090, SEQ ID NO: 1096, SEQ ID NO: 1102, SEQ ID NO: 1108, SEQ ID NO: 1114, SEQ ID NO: 1120, SEQ ID NO: 1126, SEQ ID NO: 1132, SEQ ID NO: 1138, SEQ ID NO: 1144, SEQ ID NO: 1150, SEQ ID NO: 1156, SEQ ID NO: 1162, SEQ ID NO: 1168, SEQ ID NO: 1174, SEQ ID NO: 1180, SEQ ID NO: 1186, SEQ ID NO: 1192, SEQ ID NO: 1198, SEQ ID NO: 1204, SEQ ID NO: 1210, SEQ ID NO: 1216, SEQ ID NO: 1222, SEQ ID NO: 1228, SEQ ID NO: 1234, SEQ ID NO: 1240, SEQ ID

NO: 1246, SEQ ID NO: 1252, SEQ ID NO: 1258, SEQ ID NO: 1264, SEQ ID NO: 1270, SEQ ID NO: 1276, SEQ ID NO: 1282, SEQ ID NO: 1288, SEQ ID NO: 1294, SEQ ID NO: 1300, SEQ ID NO: 1306, SEQ ID NO: 1312, SEQ ID NO: 1318, SEQ ID NO: 1324, SEQ ID NO: 1330, SEQ ID NO: 1336, SEQ ID NO: 1342, SEQ ID NO: 1348, SEQ ID NO: 1354, SEQ ID NO: 1360, SEQ ID NO: 1366, SEQ ID NO: 1372, SEQ ID NO: 1378, SEQ ID NO: 1384, SEQ ID NO: 1390, SEQ ID NO: 1396, SEQ ID NO: 1402, SEQ ID NO: 1408, SEQ ID NO: 1414, SEQ ID NO: 1420, SEQ ID NO: 1426, SEQ ID NO: 1432, SEQ ID NO: 1438, SEQ ID NO: 1444, SEQ ID NO: 1450. SEQ ID NO: 1456, SEQ ID NO: 1462, SEQ ID NO: 1468, SEQ ID NO: 1474, SEQ ID NO: 1480, SEQ ID NO: 1486, SEQ ID NO: 1492, SEQ ID NO: 1498, SEQ ID NO: 1504, SEQ ID NO: 1510, SEQ ID NO: 1516, SEQ ID NO: 1522, SEQ ID NO: 1596, SEQ ID NO: 1528, SEQ ID NO: 1534, SEQ ID NO: 1540, SEQ ID NO: 1546, SEQ ID NO: 1552, SEQ ID NO: 1558, SEQ ID NO: 1564, SEQ ID NO: 1570, SEQ ID NO: 1576, SEQ ID NO: 1582, or SEQ ID NO: 1588 in Figure 3A, 3B, or 3C;

(e) a light chain CDR2 comprising the amino acid sequence of any one of the LCDR2s in SEQ ID NO: 401, SEQ ID NO: 407, SEQ ID NO: 413, SEQ ID NO: 419, SEQ ID NO: 425, SEQ ID NO: 431, SEQ ID NO: 437, SEQ ID NO: 443, SEQ ID NO: 449, SEQ ID NO: 455, SEQ ID NO: 461, SEQ ID NO: 467, SEQ ID NO: 473, SEQ ID NO: 479, SEQ ID NO: 485, SEQ ID NO: 491, SEQ ID NO: 497, SEQ ID NO: 503, SEQ ID NO: 509, SEQ ID NO: 515, SEQ ID NO: 521, SEQ ID NO: 527, SEQ ID NO: 533, SEQ ID NO: 539, SEQ ID NO: 545, SEQ ID NO: 551, SEQ ID NO: 557, SEQ ID NO: 563, SEQ ID NO: 569, SEQ ID NO: 575, SEQ ID NO: 581, SEQ ID NO: 587, SEQ ID NO: 593, SEQ ID NO: 599, SEQ ID NO: 605, SEQ ID NO: 611, SEQ ID NO: 617, SEQ ID NO: 623, SEQ ID NO: 629, SEQ ID NO: 635, SEQ ID NO: 641, SEQ ID NO: 647, SEQ ID NO: 653, SEQ ID NO: 659, SEQ ID NO: 665, SEQ ID NO: 671, SEQ ID NO: 677, SEQ ID NO: 683, SEQ ID NO: 689, SEQ ID NO: 695, SEQ ID NO: 701, SEQ ID NO: 707, SEQ ID NO: 713, SEQ ID NO: 719, SEQ ID NO: 725, SEQ ID NO: 731, SEQ ID NO: 737, SEQ ID NO: 743, SEQ ID NO: 749, SEQ ID NO: 755, SEQ ID NO: 761, SEQ ID NO: 767, SEQ ID NO: 773, SEQ ID NO: 779, SEQ ID NO: 785, SEQ ID NO: 791, SEQ ID NO: 797, SEQ ID NO: 803, SEQ ID NO: 809, SEQ ID NO: 815, SEQ ID NO: 821, SEQ ID NO: 827, SEQ ID NO: 833, SEQ ID NO: 839, SEQ ID NO: 845, SEQ ID NO: 851, SEQ ID NO: 857, SEQ ID NO: 863, SEQ ID NO: 869, SEQ

ID NO: 875, SEQ ID NO: 881, SEQ ID NO: 887, SEQ ID NO: 893, SEQ ID NO: 899, SEQ ID NO: 905, SEQ ID NO: 911, SEQ ID NO: 917, SEQ ID NO: 923, SEQ ID NO: 929, SEQ ID NO: 935, SEQ ID NO: 941, SEQ ID NO: 947, SEQ ID NO: 953, SEQ ID NO: 959, SEQ ID NO: 965, SEQ ID NO: 971, SEQ ID NO: 977, SEQ ID NO: 983, SEQ ID NO: 989, SEQ ID NO: 995, SEQ ID NO: 1001, SEQ ID NO: 1007, SEQ ID NO: 1013, SEQ ID NO: 1019, SEQ ID NO: 1025, SEQ ID NO: 1031, SEQ ID NO: 1037, SEQ ID NO: 1043, SEQ ID NO: 1049, SEQ ID NO: 1055, SEQ ID NO: 1061, SEQ ID NO: 1067, SEQ ID NO: 1073, SEQ ID NO: 1079, SEQ ID NO: 1085, SEQ ID NO: 1091, SEQ ID NO: 1097, SEQ ID NO: 1103, SEQ ID NO: 1109, SEQ ID NO: 1115, SEQ ID NO: 1121, SEQ ID NO: 1127, SEQ ID NO: 1133, SEQ ID NO: 1139, SEQ ID NO: 1145, SEQ ID NO: 1151, SEQ ID NO: 1157, SEQ ID NO: 1163, SEQ ID NO: 1169, SEQ ID NO: 1175, SEQ ID NO: 1181, SEQ ID NO: 1187, SEQ ID NO: 1193, SEQ ID NO: 1199, SEQ ID NO: 1205, SEQ ID NO: 1211, SEQ ID NO: 1217, SEQ ID NO: 1223, SEQ ID NO: 1229, SEQ ID NO: 1235, SEQ ID NO: 1241, SEQ ID NO: 1247, SEQ ID NO: 1253, SEQ ID NO: 1259, SEQ ID NO: 1265, SEQ ID NO: 1271, SEQ ID NO: 1277, SEQ ID NO: 1283, SEQ ID NO: 1289, SEQ ID NO: 1295, SEQ ID NO: 1301, SEQ ID NO: 1307, SEQ ID NO: 1313, SEQ ID NO: 1319, SEQ ID NO: 1325, SEQ ID NO: 1331, SEQ ID NO: 1337, SEQ ID NO: 1343, SEQ ID NO: 1349, SEQ ID NO: 1355, SEQ ID NO: 1361, SEQ ID NO: 1367, SEQ ID NO: 1373, SEQ ID NO: 1379, SEQ ID NO: 1385, SEQ ID NO: 1391, SEQ ID NO: 1397, SEQ ID NO: 1403, SEQ ID NO: 1409, SEQ ID NO: 1415, SEQ ID NO: 1421, SEQ ID NO: 1427, SEQ ID NO: 1433, SEQ ID NO: 1439, SEQ ID NO: 1445, SEQ ID NO: 1451, SEQ ID NO: 1457, SEQ ID NO: 1463, SEQ ID NO: 1469, SEQ ID NO: 1475, SEQ ID NO: 1481, SEQ ID NO: 1487, SEQ ID NO: 1493, SEQ ID NO: 1499, SEQ ID NO: 1505, SEQ ID NO: 1511, SEQ ID NO: 1517, SEQ ID NO: 1523, SEQ ID NO: 1597, SEQ ID NO: 1529, SEQ ID NO: 1535, SEQ ID NO: 1541, SEQ ID NO: 1547, SEQ ID NO: 1553, SEQ ID NO: 1559, SEQ ID NO: 1565, SEQ ID NO: 1571, SEQ ID NO: 1577, SEQ ID NO: 1583, or SEQ ID NO: 1589 in Figure 3A, 3B, or 3C; and

(f) a light chain CDR3 comprising the amino acid sequence of any one of the LCDR3s in SEQ ID NO: 402, SEQ ID NO: 408, SEQ ID NO: 414, SEQ ID NO: 420, SEQ ID NO: 426, SEQ ID NO: 432, SEQ ID NO: 438, SEQ ID NO: 444, SEQ ID NO: 450, SEQ ID NO: 456, SEQ ID NO: 462, SEQ ID NO: 468, SEQ ID NO: 474, SEQ ID NO: 480, SEQ

ID NO: 486, SEQ ID NO: 492, SEQ ID NO: 498, SEQ ID NO: 504, SEQ ID NO: 510, SEQ ID NO: 516, SEQ ID NO: 522, SEQ ID NO: 528, SEQ ID NO: 534, SEQ ID NO: 540, SEQ ID NO: 546, SEQ ID NO: 552, SEQ ID NO: 558, SEQ ID NO: 564, SEQ ID NO: 570, SEQ ID NO: 576, SEQ ID NO: 582, SEQ ID NO: 588, SEQ ID NO: 594, SEQ ID NO: 600, SEQ ID NO: 606, SEQ ID NO: 612, SEQ ID NO: 618, SEQ ID NO: 624, SEQ ID NO: 630, SEQ ID NO: 636, SEQ ID NO: 642, SEQ ID NO: 648, SEQ ID NO: 654, SEQ ID NO: 660, SEQ ID NO: 666, SEQ ID NO: 672, SEQ ID NO: 678, SEQ ID NO: 684, SEQ ID NO: 690, SEQ ID NO: 696, SEQ ID NO: 702, SEQ ID NO: 708, SEQ ID NO: 714, SEQ ID NO: 720, SEQ ID NO: 726, SEQ ID NO: 732, SEQ ID NO: 738, SEQ ID NO: 744, SEQ ID NO: 750, SEQ ID NO: 756, SEQ ID NO: 762, SEQ ID NO: 768, SEQ ID NO: 774, SEQ ID NO: 780, SEQ ID NO: 786, SEQ ID NO: 792, SEQ ID NO: 798, SEQ ID NO: 804, SEQ ID NO: 810, SEQ ID NO: 816, SEQ ID NO: 822, SEQ ID NO: 828, SEQ ID NO: 834, SEQ ID NO: 840, SEQ ID NO: 846, SEQ ID NO: 852, SEQ ID NO: 858, SEQ ID NO: 864, SEQ ID NO: 870, SEQ ID NO: 876, SEQ ID NO: 882, SEQ ID NO: 888, SEQ ID NO: 894, SEQ ID NO: 900, SEQ ID NO: 906, SEQ ID NO: 912, SEQ ID NO: 918, SEQ ID NO: 924, SEQ ID NO: 930, SEQ ID NO: 936, SEQ ID NO: 942, SEQ ID NO: 948, SEQ ID NO: 954, SEQ ID NO: 960, SEQ ID NO: 966, SEQ ID NO: 972, SEQ ID NO: 978, SEQ ID NO: 984, SEQ ID NO: 990, SEQ ID NO: 996, SEQ ID NO: 1002, SEQ ID NO: 1008, SEQ ID NO: 1014, SEQ ID NO: 1020, SEQ ID NO: 1026, SEQ ID NO: 1032, SEQ ID NO: 1038, SEQ ID NO: 1044, SEQ ID NO: 1050, SEQ ID NO: 1056, SEQ ID NO: 1062, SEQ ID NO: 1068, SEQ ID NO: 1074, SEQ ID NO: 1080, SEQ ID NO: 1086, SEQ ID NO: 1092, SEQ ID NO: 1098, SEQ ID NO: 1104, SEQ ID NO: 1110, SEQ ID NO: 1116, SEQ ID NO: 1122, SEQ ID NO: 1128, SEQ ID NO: 1134, SEQ ID NO: 1140, SEQ ID NO: 1146, SEQ ID NO: 1152, SEQ ID NO: 1158, SEQ ID NO: 1164, SEQ ID NO: 1170, SEQ ID NO: 1176, SEQ ID NO: 1182, SEQ ID NO: 1188, SEQ ID NO: 1194, SEQ ID NO: 1200, SEQ ID NO: 1206, SEQ ID NO: 1212, SEQ ID NO: 1218, SEQ ID NO: 1224, SEQ ID NO: 1230, SEQ ID NO: 1236, SEQ ID NO: 1242, SEQ ID NO: 1248, SEQ ID NO: 1254, SEQ ID NO: 1260, SEQ ID NO: 1266, SEQ ID NO: 1272, SEQ ID NO: 1278, SEQ ID NO: 1284, SEQ ID NO: 1290, SEQ ID NO: 1296, SEQ ID NO: 1302, SEQ ID NO: 1308, SEQ ID NO: 1314, SEQ ID NO: 1320, SEQ ID NO: 1326, SEQ ID NO: 1332, SEQ ID NO: 1338, SEQ ID NO: 1344, SEQ ID NO: 1350, SEQ ID NO: 1356,

SEQ ID NO: 1362, SEQ ID NO: 1368, SEQ ID NO: 1374, SEQ ID NO: 1380, SEQ ID NO: 1386, SEQ ID NO: 1392, SEQ ID NO: 1398, SEQ ID NO: 1404, SEQ ID NO: 1410, SEQ ID NO: 1416, SEQ ID NO: 1422, SEQ ID NO: 1428, SEQ ID NO: 1434, SEQ ID NO: 1440, SEQ ID NO: 1446, SEQ ID NO: 1452, SEQ ID NO: 1458, SEQ ID NO: 1464, SEQ ID NO: 1470, SEQ ID NO: 1476, SEQ ID NO: 1482, SEQ ID NO: 1488, SEQ ID NO: 1494, SEQ ID NO: 1500, SEQ ID NO: 1506, SEQ ID NO: 1512, SEQ ID NO: 1518, SEQ ID NO: 1524, SEQ ID NO: 1598, SEQ ID NO: 1530, SEQ ID NO: 1536, SEQ ID NO: 1542, SEQ ID NO: 1548, SEQ ID NO: 1554, SEQ ID NO: 1560, SEQ ID NO: 1566, SEQ ID NO: 1572, SEQ ID NO: 1578, SEQ ID NO: 1584, or SEQ ID NO: 1590 in Figure 3A, 3B, or 3C,

wherein the HCDR1, HCDR2, HCDR3, LCDR1, LCDR2, and LCDR3 are from a same clone.

22. An isolated antibody that comprises a heavy chain comprising the heavy chain amino acid variable sequence in any one of SEQ ID NO. 1 – SEQ ID NO: 97, SEQ ID NO: 195 – SEQ ID NO: 209, or SEQ ID NO: 225 – SEQ ID NO: 310 in Figures 2A, 2B, or 2C, or a sequence at least 90% identical thereto.

23. An isolated antibody that comprises a light chain comprising the light chain amino acid variable sequence in any one of SEQ ID NO: 98 – SEQ ID NO: 194, SEQ ID NO: 210 – SEQ ID NO: 224, or SEQ ID NO: 311 – SEQ ID NO: 396 in Figures 2A, 2B, or 2C, or a sequence at least 90% identical thereto.

24. An isolated antibody that comprises:

a heavy chain comprising the heavy chain amino acid variable sequence in any one of SEQ ID NO. 1 – SEQ ID NO: 97, SEQ ID NO: 195 – SEQ ID NO: 209, or SEQ ID NO: 225 – SEQ ID NO: 310 in Figures 2A, 2B, or 2C, or a sequence at least 90% identical thereto; and

a light chain comprising the light chain amino acid variable sequence in any one of SEQ ID NO: 98 – SEQ ID NO: 194, SEQ ID NO: 210 – SEQ ID NO: 224, or SEQ ID NO: 311 – SEQ ID NO: 396 in Figures 2A, 2B, or 2C or a sequence at least 90% identical thereto.

25. The isolated antigen binding molecule of any one of claims 1-20 or isolated antibody of any one of claims 21-24, wherein the antigen binding molecule binds to human TIGIT with a K_D of $1x10^{-7}M$ or less.
26. The isolated antigen binding molecule of any one of claims 1-20 or isolated antibody of any one of claims 21-24, wherein the antigen binding molecule has antagonist activity to human TIGIT.
27. The isolated antigen binding molecule of any one of claims 1-20, wherein the antigen binding molecule is an antibody.
28. The isolated antigen binding molecule of claim 27, wherein the antibody is an intact human antibody.
29. The isolated antigen binding molecule of claim 27, wherein the antibody is an antibody binding fragment.
30. The isolated antigen binding molecule of claim 27, wherein the antibody is a chimeric or a humanized antibody.
31. The isolated antigen binding molecule of claim 27, wherein the antibody binds to human TIGIT with a K_D of 100 nM or less.
32. A composition comprising:
    an isolated antigen binding molecule according to any one of claims 1-20, 25-31, or antibody of claims 21-24 in an amount that is pharmaceutically acceptable; and
    a pharmaceutically acceptable carrier.
33. A method of treating a TIGIT related disorder comprising:
    (a) Identifying a subject with a TIGIT related disorder and
    (b) administering an effective dose of the isolated antigen binding molecule or antibody of any one of the above claims to the subject.
34. The method of claim 33, wherein the TIGIT related disorder is selected from the group consisting of at least one of: HIV, psoriasis, arthritis, inflammatory bowel disease, and cancer.
35. The method of claim 34, wherein cancer is at least one of: a solid tumor which is infiltrated by tumor-infiltrating lymphocytes which express TIGIT, osteosarcoma, rhabdomyosarcoma, neuroblastoma, kidney cancer, leukemia, renal transitional cell

cancer, bladder cancer, Wilm's cancer, ovarian cancer, pancreatic cancer, breast cancer, prostate cancer, bone cancer, lung cancer, non-small cell lung cancer, gastric cancer, colon cancer, colorectal cancer, cervical cancer, synovial sarcoma, head and neck cancer, squamous cell carcinoma, multiple myeloma, renal cell cancer, retinoblastoma, hepatoblastoma, hepatocellular carcinoma, melanoma, rhabdoid tumor of the kidney, Ewing's sarcoma, chondrosarcoma, brain cancer, glioblastoma, meningioma, pituitary adenoma, vestibular schwannoma, a primitive neuroectodermal tumor, medulloblastoma, astrocytoma, anaplastic astrocytoma, oligodendroglioma, ependymoma, choroid plexus papilloma, polycythemia vera, thrombocythemia, idiopathic myelfibrosis, soft tissue sarcoma, thyroid cancer, endometrial cancer, carcinoid cancer or liver cancer, breast cancer, gastric cancer, a metastatic cancer of the varieties described above.

36. A method of enhancing T-cell activation:
    (a) diagnosing an individual with low T-cell counts; and
    (b) administering an effective dose of the isolated antigen binding molecule or isolated antibody of any one of claims 1-31.
37. The method of claim 36, wherein T-cell activation is of CD8+ T cells.
38. A method of making an isolated antigen binding molecule that binds to human TIGIT comprising:
    providing a nucleic acid that encodes for the isolated antigen binding molecule or isolated antibody of any one of claims 1-31; and
    expressing a protein encoded by the nucleic acid.
39. The method of claim 38, wherein the isolated antigen binding molecule is expressed in a CHO cell.
40. A kit for determining the presence of human TIGIT, the kit comprising:
    the isolated antigen binding molecule or isolated antibody of any one of claims 1-31; and
    a detectable marker.
41. A method of preventing, treating and/or lessening the severity of an immune-related disease relating to aberrant immune cell response in a subject comprising modulating

the activity of TIGIT in the subject by administering an effective amount of any one or more of the isolated antigen binding molecules or antibodies of any one of claims 1-31.

42. A method of increasing or stimulating an immune response by administering in vitro or in vivo an antagonist of TIGIT activity, and/or by inhibiting intracellular signaling mediated by TIGIT binding to PVR (aka CD155), wherein the antagonist of TIGIT activity is any one or more of the isolated antigen binding molecules or isolated antibodies of claims 1-31.
43. A method of increasing T cell activation, the method comprising administering any one or more of the isolated antigen binding molecules or isolated antibodies of any one of claims 1-31 to a subject in an amount sufficient to block TIGIT in the subject.
44. A method of treating an infection or infectious disease in a human subject, comprising administering to a subject who has an infectious disease an effective amount of the isolated antigen binding molecule or isolated antibody of any one of claims 1-31.
45. A method for increasing an effectiveness of a vaccine comprising:
administering a vaccine to a subject; and
administering any one or more of the isolated antigen binding molecules or antibodies of claims 1-31 to the subject in an amount sufficient to serve as an adjuvant for the vaccine.
46. A method for treating an infection, the method comprising:
identifying a subject that has a viral infection, a bacterial infection, parasitic infection, and/or a fungal infection; and
administering any one or more of the antigen binding molecules or isolated antibodies of claims 1-31 to the subject in an amount and for a duration sufficient to treat the viral infection, the bacterial infection, the parasitic infection, and/or the fungal infection.
47. The method of claim 46, wherein the viral infection is an infection with a virus selected from the group consisting of at least one of: human immunodeficiency virus (HIV), hepatitis virus (A, B, or C), herpes virus (e.g., VZV, HSV-I, HAV-6, HSV-II, and CMV, Epstein Barr virus), adenovirus, influenza virus, flaviviruses, echovirus,

rhinovirus, coxsackie virus, coronavirus, respiratory syncytial virus, mumps virus, rotavirus, measles virus, rubella virus, parvovirus, vaccinia virus, HTLV virus, dengue virus, papillomavirus, molluscum virus, poliovirus, rabies virus, JC virus and arboviral encephalitis virus.

48. The method of claim 46, wherein the bacterial infection is infection with a bacteria selected from the group consisting of at least one or: Chlamydia, rickettsial bacteria, mycobacteria, staphylococci, streptococci, pneumonococci, meningococci and gonococci, klebsiella, proteus, serratia, pseudomonas, Legionella, Coryneb acterium diphtheriae, Salmonella, bacilli, Vibrio cholerae, Clostridium tetan, Clostridium botulinum, Bacillus anthricis, Yersinia pestis, Mycobacterium leprae, Mycobacterium lepromatosis, and Borriella.
49. The method of claim 46, wherein the fungal infection is infection with a fungus selected from the group consisting of at least one of: Candida (albicans, krusei, glabrata, tropicalis, etc.), Cryptococcus neoformans, Aspergillus (fumigatus, niger, etc.), Genus Mucorales (mucor, absidia, rhizopus), Sporothrix schenkii, Blastomyces dermatitidis, Paracoccidioides brasiliensis, Coccidioides immitis, and Histoplasma capsulatum.
50. The method of claim 46, wherein the parasitic infection is infection with a parasite selected from the group consisting of at least one of: Entamoeba histolytica, Balantidium coli, Naegleria fowleri, Acanthamoeba, Giardia lambia, Cryptosporidium, Pneumocystis carinii, Plasmodium vivax, Babesia microti, Trypanosoma brucei, Trypanosoma cruzi, Leishmania donovani, Toxoplasma gondii, and Nippostrongylus brasiliensis.
51. A method for preventing and/or inhibiting TIGIT binding to MHC class II to enhance antigen-specific T-cell activation or stimulating T-cell production of interleukin-2 in a subject, the method comprising administering any one or more of the antigen binding molecules of claims 1-31 to a subject in an amount sufficient for preventing and/or inhibiting TIGIT binding to MHC class II in the subject.

52. The isolated antigen binding molecule or isolated antibody of any one of claims 1-31, wherein the antigen binding molecule blocks binding of human TIGIT to human CD155 and human CD112.
53. The isolated antigen binding molecule or antibody of any one of claims 1-31, wherein the isolated antigen binding molecule or antibody is a bispecific antibody.
54. The isolated antigen binding molecule of claim 53, wherein the bispecific antibody further binds to PD-1.
55. The isolated antigen binding molecule or antibody of claim 1, wherein the antigen binding molecule or antibody is an agonist to TIGIT.
56. The isolated antigen binding molecule or antibody of claim 1, wherein the antigen binding molecule or antibody is an antagonist to TIGIT.
57. A method of preventing, treating and/or lessening the severity of a disease in a subject comprising modulating the activity of TIGIT in the subject by administering an effective amount of any one or more of the isolated antigen binding molecules or isolated antibody of any one of claims 1-31, wherein the disease is selected from the group consisting of: systemic lupus erythematosis, rheumatoid arthritis, juvenile chronic arthritis, spondyloarthropathies, systemic sclerosis (scleroderma), idiopathic inflammatory myopathies (dermatomyositis, polymyositis), Sjogren's syndrome, systemic vasculitis, sarcoidosis, autoimmune hemolytic anemia (immune pancytopenia, paroxysmal nocturnal hemoglobinuria), autoimmune thrombocytopenia (idiopathic thrombocytopenic purpura, immune-mediated thrombocytopenia), thyroiditis (Grave's disease, Hashimoto's thyroiditis, juvenile lymphocytic thyroiditis, atrophic thyroiditis), diabetes mellitus, immune-mediated renal disease (glomerulonephritis, tubulointerstitial nephritis), demyelinating diseases of the central and peripheral nervous systems such as multiple sclerosis, idiopathic demyelinating polyneuropathy or Guillain-Barre syndrome, and chronic inflammatory demyelinating polyneuropathy, hepatobiliary diseases such as infectious hepatitis (hepatitis A, B, C, D, E and other non-hepatotropic viruses), autoimmune chronic active hepatitis, primary biliary cirrhosis, granulomatous hepatitis, and sclerosing cholangitis, inflammatory bowel disorder (IBD) (ulcerative colitis: Crohn's disease), gluten-

sensitive enteropathy, and Whipple's disease, autoimmune or immune-mediated skin diseases including bullous skin diseases, erythema multiforme and contact dermatitis, psoriasis, allergic diseases such as asthma, allergic rhinitis, atopic dermatitis, food hypersensitivity and urticaria, immunologic diseases of the lung such as eosinophilic pneumonias, idiopathic pulmonary fibrosis and hypersensitivity pneumonitis, transplantation associated diseases including graft rejection and graft-versus-host-disease. Infectious diseases including viral diseases such as AIDS (HIV infection), hepatitis A, B, C, D, and E, herpes, etc., bacterial infections, fungal infections, protozoal infections and parasitic infections also may have immune and/or inflammatory components and/or etiology.

58. An isolated antigen binding molecule that binds to human TIGIT, wherein the isolated antigen binding molecule comprises at least one of

(a) (i) a heavy chain variable region comprising the heavy chain of clone Ab117 (SEQ ID NO: 62) and

(ii) a light chain variable region comprising the light chain of clone Ab117 (SEQ ID NO: 159);

(b) (i) a heavy chain variable region comprising the heavy chain of clone Ab53 (SEQ ID NO: 199) and

(ii) a light chain variable region comprising the light chain of clone Ab53 (SEQ ID NO: 214);

(c) (i) a heavy chain variable region comprising the heavy chain of clone Ab40 (SEQ ID NO: 200) and

(ii) a light chain variable region comprising the light chain of clone Ab40 (SEQ ID NO: 215);

(d) (i) a heavy chain variable region comprising the heavy chain of clone Ab48 (SEQ ID NO: 203) and

(ii) a light chain variable region comprising the light chain of clone Ab48 (SEQ ID NO: 218);

(e) (i) a heavy chain variable region comprising the heavy chain of clone Ab1 (SEQ ID NO: 299) and

(ii) a light chain variable region comprising the light chain of clone Ab1 (SEQ ID NO: 385); or

(f) (i) a heavy chain variable region comprising the heavy chain of clone Ab143 (SEQ ID NO: 279) and

(ii) a light chain variable region comprising the light chain of clone Ab143 (SEQ ID NO: 365).

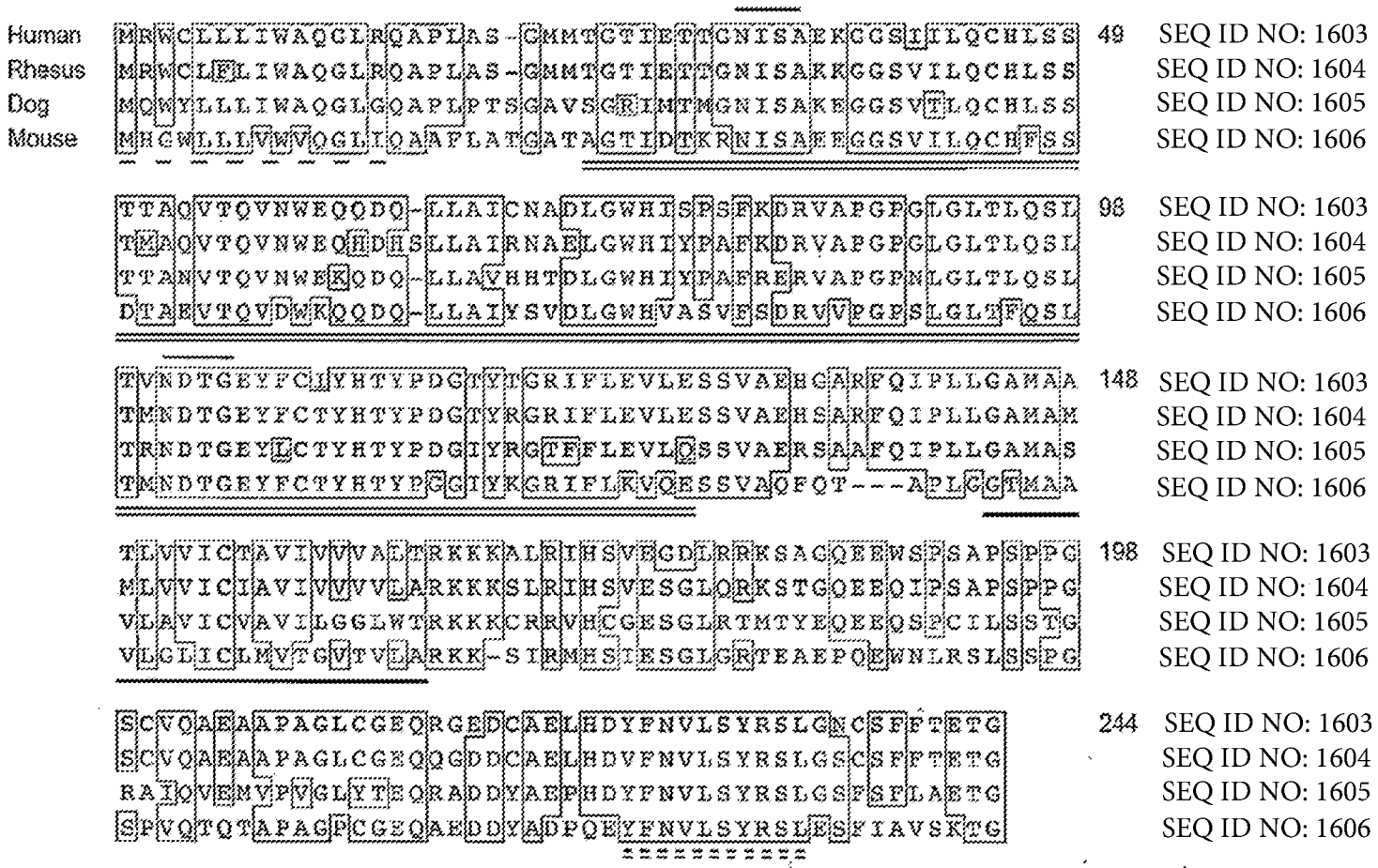

Human
Rhesus
Dog
Mouse
49
98
148
198
244
SEQ ID NO: 1603
SEQ ID NO: 1604
SEQ ID NO: 1605
SEQ ID NO: 1606

FIG. 1

FIG 2A
(ARE) VH

clone	Vh	SEQ ID NOs.
Ab58	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVSSIKSSAGSSYYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYDVWIDYWGQGTLVTVSS	SEQ ID NO: 1
Ab69	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMSWVRQAPGKGLEWVAAIKGSTSSSYYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYDVWLDYWGQGTLVTVSS	SEQ ID NO: 2
Ab75	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMSWVRQAPGKGLEWVAAIKSNAGTSSYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYDVWLDYWGQGTLVTVSS	SEQ ID NO: 3
Ab133	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVSSISSNTGSISYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYDVWLDYWGQGTLVTVSS	SEQ ID NO: 4
Ab177	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMSWVRQAPGKGLEWVADISSSASTIGYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYDVWMDYWGQGTLVTVSS	SEQ ID NO: 5
Ab122	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMSWVRQAPGKGLEWVSAISGSGGSTYYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYDVWMDYWGQGTLVTVSS	SEQ ID NO: 6
Ab86	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMSWVRQAPGKGLEWVSSISSNTGTSYYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYDVWMDYWGQGTLVTVSS	SEQ ID NO: 7
Ab180	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMSWVRQAPGKGLEWVSSISSNTGTSYYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYDVWMDYWGQGTLVTVSS	SEQ ID NO: 8
Ab83	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMSWVRQAPGKGLEWVAAISGSAGTSGYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYDYWLDYWGQGTLVTVSS	SEQ ID NO: 9
Ab26	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMSWVRQAPGKGLEWVADIKSSGSTKSYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYDYWMDYWGQGTLVTVSS	SEQ ID NO: 10
Ab20	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVSAISGSGGSTYYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYDYWMDYWGQGTLVTVSS	SEQ ID NO: 11
Ab147	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVSAISGSGGSTYYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYDYWMDYWGQGTLVTVSS	SEQ ID NO: 12
Ab12	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVASINSNGGYKSYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYGTWLDYWGQGTLVTVSS	SEQ ID NO: 13
Ab66	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVSAISGSGGSTYYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYGVWIDYWGQGTLVTVSS	SEQ ID NO: 14
Ab176	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMNWVRQAPGKGLEWVASIKGSASTIYYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYGVWLDYWGQGTLVTVSS	SEQ ID NO: 15
Ab96	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVASIKSNTGSSSYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYGVWLDYWGQGTLVTVSS	SEQ ID NO: 16
Ab123	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMSWVRQAPGKGLEWVASISSSAGTSSYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYGVWLDYWGQGTLVTVSS	SEQ ID NO: 17
Ab109	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVAYINSNTGTIYYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYGVWLDYWGQGTLVTVSS	SEQ ID NO: 18
Ab149	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVAYISGNTGYIGYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYGVWLDYWGQGTLVTVSS	SEQ ID NO: 19
Ab34	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVSAISGSGGSTYYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYGVWLDYWGQGTLVTVSS	SEQ ID NO: 20
Ab61	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVSAISGSGGSTYYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYGVWLDYWGQGTLVTVSS	SEQ ID NO: 21
Ab64	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMSWVRQAPGKGLEWVSAISSNAGSTSYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYGVWLDYWGQGTLVTVSS	SEQ ID NO: 22
Ab105	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMSWVRQAPGKGLEWVSSINSNAGTTYYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYGVWLDYWGQGTLVTVSS	SEQ ID NO: 23
Ab108	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMSWVRQAPGKGLEWVSSINSNAGTTYYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYGVWLDYWGQGTLVTVSS	SEQ ID NO: 24
Ab178	EVQLLESGGGLVQPGGSLRLSCAASGFTFDSYSMNWVRQAPGKGLEWVAAIKSDASTIGYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYGVWMDYWGQGTLVTVSS	SEQ ID NO: 25
Ab166	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMNWVRQAPGKGLEWVAAISGSTGTISYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYGVWMDYWGQGTLVTVSS	SEQ ID NO: 26
Ab29	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYGMNWVRQAPGKGLEWVANINSNSGSIYYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYGVWMDYWGQGTLVTVSS	SEQ ID NO: 27

FIG 2A
(ARE) VH

clone	Vh	SEQ ID NOs.
Ab135	EVQLLESGGGLVQPGGSLRLSCAASGFTFDSYAMNWVRQAPGKGLEWVASINSNTGSIYYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYGVWMDYWGQGTLVTVSS	SEQ ID NO: 28
Ab171	EVQLLESGGGLVQPGGSLRLSCAASGFTFDSYAMNWVRQAPGKGLEWVASINSNTGSIYYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYGVWMDYWGQGTLVTVSS	SEQ ID NO: 29
Ab194	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMSWVRQAPGKGLEWVSAINGNAGSIGYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYGVWMDYWGQGTLVTVSS	SEQ ID NO: 30
Ab184	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVSAISGSGGSTYYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYGVWMDYWGQGTLVTVSS	SEQ ID NO: 31
Ab164	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVSYINSNTGSIGYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYGVWMDYWGQGTLVTVSS	SEQ ID NO: 32
Ab183	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVSYINSNTGSIGYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYGVWMDYWGQGTLVTVSS	SEQ ID NO: 33
Ab158	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMSWVRQAPGKGLEWVAAIKGSAGTSGYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYGYWLDYWGQGTLVTVSS	SEQ ID NO: 34
Ab55	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVASISGNTGTSSYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYGYWLDYWGQGTLVTVSS	SEQ ID NO: 35
Ab136	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVSAISGSGGSTYYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYGYWLDYWGQGTLVTVSS	SEQ ID NO: 36
Ab39	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVSSIWSNGGSIYYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYGYWLDYWGQGTLVTVSS	SEQ ID NO: 37
Ab159	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMNWVRQAPGKGLEWVASIKSSTGTTGYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYGYWMDYWGQGTLVTVSS	SEQ ID NO: 38
Ab151	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVASIKSSTGYISYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYGYWMDYWGQGTLVTVSS	SEQ ID NO: 39
Ab139	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMSWVRQAPGKGLEWVASISGSASYSYYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYGYWMDYWGQGTLVTVSS	SEQ ID NO: 40
Ab107	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMSWVRQAPGKGLEWVSDIKSSAGSTYYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYGYWMDYWGQGTLVTVSS	SEQ ID NO: 41
Ab36	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVASIKSSGSYKSYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYSTWLDYWGQGTLVTVSS	SEQ ID NO: 42
Ab193	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVSAIKSDTSTIYYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYSTWLDYWGQGTLVTVSS	SEQ ID NO: 43
Ab115	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVAAIKGNAGSTSYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYSTWMDYWGQGTLVTVSS	SEQ ID NO: 44
Ab106	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMNWVRQAPGKGLEWVASIKSSTGTISYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYSVWIDYWGQGTLVTVSS	SEQ ID NO: 45
Ab138	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVASIKSSTGTTGYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYSVWIDYWGQGTLVTVSS	SEQ ID NO: 46
Ab127	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMNWVRQAPGKGLEWVAYIKSDTGSIGYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYSVWIDYWGQGTLVTVSS	SEQ ID NO: 47
Ab165	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVAAIKSSTGTIYYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYSVWLDYWGQGTLVTVSS	SEQ ID NO: 48
Ab155	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMNWVRQAPGKGLEWVAAISGDTGTSGYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYSVWLDYWGQGTLVTVSS	SEQ ID NO: 49
Ab19	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMSWVRQAPGKGLEWVANIKSNSGYTYYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYSVWLDYWGQGTLVTVSS	SEQ ID NO: 50
Ab6	EVQLLESGGGLVQPGGSLRLSCAASGFTFSDYSMSWVRQAPGKGLEWVARISSSSSYKSYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYSVWLDYWGQGTLVTVSS	SEQ ID NO: 51
Ab187	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMSWVRQAPGKGLEWVASIKSDASTTGYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYSVWLDYWGQGTLVTVSS	SEQ ID NO: 52
Ab179	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVASIKSNTGSTYYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYSVWLDYWGQGTLVTVSS	SEQ ID NO: 53
Ab65	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVAYIKSNTGSISYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYSVWLDYWGQGTLVTVSS	SEQ ID NO: 54

FIG 2A
(ARE) VH

clone	Vh	SEQ ID NOs.
Ab114	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMSWVRQAPGKGLEWVAYISSNTGSTYYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYSVWLDYWGQGTLVTVSS	SEQ ID NO: 55
Ab102	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVSAINSNAGYTYYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYSVWLDYWGQGTLVTVSS	SEQ ID NO: 56
Ab94	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVSAISGSGGSTYYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYSVWLDYWGQGTLVTVSS	SEQ ID NO: 57
Ab163	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVSAISGSGGSTYYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYSVWLDYWGQGTLVTVSS	SEQ ID NO: 58
Ab110	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVSSIKSNTGSTYYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYSVWLDYWGQGTLVTVSS	SEQ ID NO: 59
Ab80	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMSWVRQAPGKGLEWVSSIKSSTGSTYYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYSVWLDYWGQGTLVTVSS	SEQ ID NO: 60
Ab92	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVAAIKSSASTIYYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYSVWMDYWGQGTLVTVSS	SEQ ID NO: 61
Ab117	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVAAIKSSASTIYYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYSVWMDYWGQGTLVTVSS	SEQ ID NO: 62
Ab162	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVAAIKSSASTIYYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYSVWMDYWGQGTLVTVSS	SEQ ID NO: 63
Ab121	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMNWVRQAPGKGLEWVAAISSSAGTSSYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYSVWMDYWGQGTLVTVSS	SEQ ID NO: 64
Ab195	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVADISGSASSSYYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYSVWMDYWGQGTLVTVSS	SEQ ID NO: 65
Ab84	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVASIKSSTGTSYYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYSVWMDYWGQGTLVTVSS	SEQ ID NO: 66
Ab161	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMSWVRQAPGKGLEWVASIKSSTGYTSYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYSVWMDYWGQGTLVTVSS	SEQ ID NO: 67
Ab198	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVASIKSSTSSTYYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYSVWMDYWGQGTLVTVSS	SEQ ID NO: 68
Ab24	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVSAISGSGGSTYYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYSVWMDYWGQGTLVTVSS	SEQ ID NO: 69
Ab98	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVSAISGSGGSTYYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYSVWMDYWGQGTLVTVSS	SEQ ID NO: 70
Ab116	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVSAISGSGGSTYYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYSVWMDYWGQGTLVTVSS	SEQ ID NO: 71
Ab174	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVSAISGSGGSTYYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYSVWMDYWGQGTLVTVSS	SEQ ID NO: 72
Ab196	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMNWVRQAPGKGLEWVSSIKGSAGTTSYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYSVWMDYWGQGTLVTVSS	SEQ ID NO: 73
Ab51	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVSSIKSNSGSKSYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYSVWMDYWGQGTLVTVSS	SEQ ID NO: 74
Ab91	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMSWVRQAPGKGLEWVAAIKGSAGSSSYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYSYWLDYWGQGTLVTVSS	SEQ ID NO: 75
Ab185	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVAAIKSNAGSSYYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYSYWLDYWGQGTLVTVSS	SEQ ID NO: 76
Ab23	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVARINSDSSNTYYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYSYWLDYWGQGTLVTVSS	SEQ ID NO: 77
Ab7	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVASIKSSSSSISYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYSYWLDYWGQGTLVTVSS	SEQ ID NO: 78
Ab95	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVASIKSSTGYIGYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYSYWLDYWGQGTLVTVSS	SEQ ID NO: 79
Ab100	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVASINGNAGTISYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYSYWLDYWGQGTLVTVSS	SEQ ID NO: 80
Ab140	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVASINSNTGSIGYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYSYWLDYWGQGTLVTVSS	SEQ ID NO: 81

FIG 2A
(ARE) VH

clone	Vh	SEQ ID NOs.
Ab145	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVASISSSTGYTSYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYSYWLDYWGQGTLVTVSS	SEQ ID NO: 82
Ab150	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVSAISGSGGSTYYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYSYWLDYWGQGTLVTVSS	SEQ ID NO: 83
Ab168	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVSSIKSDTSSTYYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYSYWLDYWGQGTLVTVSS	SEQ ID NO: 84
Ab54	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVSSIKSNTGSTSYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYSYWLDYWGQGTLVTVSS	SEQ ID NO: 85
Ab77	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMNWVRQAPGKGLEWVAAISGNTGYTYYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYSYWMDYWGQGTLVTVSS	SEQ ID NO: 86
Ab43	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVANIKSNSGYTSYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYSYWMDYWGQGTLVTVSS	SEQ ID NO: 87
Ab160	EVQLLESGGGLVQPGGSLRLSCAASGFTFDSYAMNWVRQAPGKGLEWVASIKSNAGYSSYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYSYWMDYWGQGTLVTVSS	SEQ ID NO: 88
Ab82	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMNWVRQAPGKGLEWVASIKSNTGTTGYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYSYWMDYWGQGTLVTVSS	SEQ ID NO: 89
Ab189	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMSWVRQAPGKGLEWVASIKSSASYSSYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYSYWMDYWGQGTLVTVSS	SEQ ID NO: 90
Ab17	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVASIKSSGGNTYYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYSYWMDYWGQGTLVTVSS	SEQ ID NO: 91
Ab103	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVASIKSSTSSTYYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYSYWMDYWGQGTLVTVSS	SEQ ID NO: 92
Ab18	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVASISSSGGNTYYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYSYWMDYWGQGTLVTVSS	SEQ ID NO: 93
Ab130	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVSAISGSGGSTYYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYSYWMDYWGQGTLVTVSS	SEQ ID NO: 94
Ab132	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMNWVRQAPGKGLEWVSSISGNAGSIYYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYSYWMDYWGQGTLVTVSS	SEQ ID NO: 95
Ab134	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMNWVRQAPGKGLEWVSSISGNAGSIYYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYSYWMDYWGQGTLVTVSS	SEQ ID NO: 96
Ab144	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMNWVRQAPGKGLEWVSSISGNAGSIYYADSVKGRFTISRDNSK NTLYLQMNSLRAEDTAVYYCAREPYSYWMDYWGQGTLVTVSS	SEQ ID NO: 97

FIG 2A
(ARE) VL

clone	VL	SEQ ID NOs..
Ab58	DIQMTQSPSSLSASVGDRVTITCRASQSISYYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 98
Ab69	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 99
Ab75	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 100
Ab133	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 101
Ab177	DIQMTQSPSSLSASVGDRVTITCRASQSISYYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 102
Ab122	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 103
Ab86	DIQMTQSPSSLSASVGDRVTITCRASQSISYYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 104
Ab180	DIQMTQSPSSLSASVGDRVTITCRASQSISYYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 105
Ab83	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 106
Ab26	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 107
Ab20	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 108
Ab147	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 109
Ab12	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 110
Ab66	DIQMTQSPSSLSASVGDRVTITCRASQSISYYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 111
Ab176	DIQMTQSPSSLSASVGDRVTITCRASQSISYYVNFYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 112
Ab96	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 113
Ab123	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 114
Ab109	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 115
Ab149	DIQMTQSPSSLSASVGDRVTITCRASQSISSYANWYQQKPGKAPKLVIYGNSSRESGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSGDSNLTFGGGTKVEIK	SEQ ID NO: 116
Ab34	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 117
Ab61	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 118
Ab64	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 119
Ab105	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 120
Ab108	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 121
Ab178	DIQMTQSPSSLSASVGDRVTITCRASQSISYYVNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 122
Ab166	DIQMTQSPSSLSASVGDRVTITCRASQSISYYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 123
Ab29	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 124

FIG 2A
(ARE) VL

clone	VL	SEQ ID NOs..
Ab135	DIQMTQSPSSLSASVGDRVTITCRASQSISSYANWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 125
Ab171	DIQMTQSPSSLSASVGDRVTITCRASQSISSYANWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 126
Ab194	DIQMTQSPSSLSASVGDRVTITCRASQSISYYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 127
Ab184	DIQMTQSPSSLSASVGDRVTITCRASQSISYYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 128
Ab164	DIQMTQSPSSLSASVGDRVTITCRASQSISYYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 129
Ab183	DIQMTQSPSSLSASVGDRVTITCRASQSISYYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 130
Ab158	DIQMTQSPSSLSASVGDRVTITCRASQSISSYVAWYQQKPGKAPKLLIYGNTSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQGDENPLTFGGGTKVEIK	SEQ ID NO: 131
Ab55	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 132
Ab136	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 133
Ab39	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 134
Ab159	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 135
Ab151	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 136
Ab139	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 137
Ab107	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 138
Ab36	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 139
Ab193	DIQMTQSPSSLSASVGDRVTITCRASQSISYYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 140
Ab115	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 141
Ab106	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 142
Ab138	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 143
Ab127	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 144
Ab165	DIQMTQSPSSLSASVGDRVTITCRASQSIIYYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 145
Ab155	DIQMTQSPSSLSASVGDRVTITCRASQSISYYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 146
Ab19	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 147
Ab6	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 148
Ab187	DIQMTQSPSSLSASVGDRVTITCRASQSISYYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 149
Ab179	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 150
Ab65	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 151

FIG 2A
(ARE) VL

clone	VL	SEQ ID NOs..
Ab114	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 152
Ab102	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 153
Ab94	DIQMTQSPSSLSASVGDRVTITCRASQSISYYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 154
Ab163	DIQMTQSPSSLSASVGDRVTITCRASQSISYYANWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 155
Ab110	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 156
Ab80	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 157
Ab92	DIQMTQSPSSLSASVGDRVTITCRASQSISYYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 158
Ab117	DIQMTQSPSSLSASVGDRVTITCRASQSISYYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 159
Ab162	DIQMTQSPSSLSASVGDRVTITCRASQSISYYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 160
Ab121	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 161
Ab195	DIQMTQSPSSLSASVGDRVTITCRASQSISYYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 162
Ab84	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 163
Ab161	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 164
Ab198	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 165
Ab24	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 166
Ab98	DIQMTQSPSSLSASVGDRVTITCRASQSISYYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 167
Ab116	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 168
Ab174	DIQMTQSPSSLSASVGDRVTITCRASQSISYYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 169
Ab196	DIQMTQSPSSLSASVGDRVTITCRASQSISYYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 170
Ab51	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 171
Ab91	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 172
Ab185	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 173
Ab23	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 174
Ab7	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 175
Ab95	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 176
Ab100	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 177
Ab140	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 178

FIG 2A
(ARE) VL

clone	VL	SEQ ID NOs..
Ab145	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 179
Ab150	DIQMTQSPSSLSASVGDRVTITCRASQSISSYVAWYQQKPGKAPKLLIYVNTSRASGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQWYEFNLTFGGGTKVEIK	SEQ ID NO: 180
Ab168	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 181
Ab54	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 182
Ab77	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 183
Ab43	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 184
Ab160	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 185
Ab82	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 186
Ab189	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 187
Ab17	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 188
Ab103	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 189
Ab18	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 190
Ab130	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 191
Ab132	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 192
Ab134	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 193
Ab144	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLT ISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 194

FIG 2B
(ARG) VH

clone	Vh	SEQ ID NOs.
Ab2	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYGMNWVRQAPGKGLEWVAGINYSSGNKYYADSVKGRFTISRD NSKNTLYLQMNSLRAEDTAVYYCARGPYASTWLDYWGQGTLVTVSS	SEQ ID NO: 195
Ab47	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMNWVRQAPGKGLEWVASIKSSSSYTSYADSVKGRFTISRD NSKNTLYLQMNSLRAEDTAVYYCARGPYDTWLDYWGQGTLVTVSS	SEQ ID NO: 196
Ab49	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMHWVRQAPGKGLEWVASIKSSGGYKSYADSVKGRFTISRD NSKNTLYLQMNSLRAEDTAVYYCARGPYDVWIDYWGQGTLVTVSS	SEQ ID NO: 197
Ab31	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYTMHWVRQAPGKGLEWVANIKSSSSTKYYADSVKGRFTISRD NSKNTLYLQMNSLRAEDTAVYYCARGPYDVWLDYWGQGTLVTVSS	SEQ ID NO: 198
Ab53	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMHWVRQAPGKGLEWVASIKSSSSNKYYADSVKGRFTISRD NSKNTLYLQMNSLRAEDTAVYYCARGPYDVWLDYWGQGTLVTVSS	SEQ ID NO: 199
Ab40	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYGMNWVRQAPGKGLEWVAGIKYSSGNKYYADSVKGRFTISRD NSKNTLYLQMNSLRAEDTAVYYCARGPYDVWMDYWGQGTLVTVSS	SEQ ID NO: 200
Ab5	EVQLLESGGGLVQPGGSLRLSCAASGFTFSDYSMNWVRQAPGKGLEWVALIKSNSGSTSYADSVKGRFTISRD NSKNTLYLQMNSLRAEDTAVYYCARGPYDVWMDYWGQGTLVTVSS	SEQ ID NO: 201
Ab9	EVQLLESGGGLVQPGGSLRLSCAASGFTFDSYSMHWVRQAPGKGLEWVANIKSSGGYISYADSVKGRFTISRD NSKNTLYLQMNSLRAEDTAVYYCARGPYDVWMDYWGQGTLVTVSS	SEQ ID NO: 202
Ab48	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMNWVRQAPGKGLEWVANIKSSGSSTSYADSVKGRFTISRD NSKNTLYLQMNSLRAEDTAVYYCARGPYDVWMDYWGQGTLVTVSS	SEQ ID NO: 203
Ab4	EVQLLESGGGLVQPGGSLRLSCAASGFTFDSYGMNWVRQAPGKGLEWVASIKYSSGYKYYADSVKGRFTISRD NSKNTLYLQMNSLRAEDTAVYYCARGPYDVWMDYWGQGTLVTVSS	SEQ ID NO: 204
Ab10	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMNWVRQAPGKGLEWVAYIKSNSGTKGYADSVKGRFTISRD NSKNTLYLQMNSLRAEDTAVYYCARGPYDYWLDYWGQGTLVTVSS	SEQ ID NO: 205
Ab37	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYGMNWVRQAPGKGLEWVSDINSNSGSTSYADSVKGRFTISRD NSKNTLYLQMNSLRAEDTAVYYCARGPYGVWLDYWGQGTLVTVSS	SEQ ID NO: 206
Ab33	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYGMHWVRQAPGKGLEWVSDISSNGGTIYYADSVKGRFTISRD NSKNTLYLQMNSLRAEDTAVYYCARGPYGVWLDYWGQGTLVTVSS	SEQ ID NO: 207
Ab42	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYGMHWVRQAPGKGLEWVARINSNGGSKSYADSVKGRFTISRD NSKNTLYLQMNSLRAEDTAVYYCARGPYGYWFDYWGQGTLVTVSS	SEQ ID NO: 208
Ab45	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYGMNWVRQAPGKGLEWVARISSSGSYIGYADSVKGRFTISRD NSKNTLYLQMNSLRAEDTAVYYCARGPYGYWLDYWGQGTLVTVSS	SEQ ID NO: 209

FIG 2B
(ARG) VL

clone	VL	SEQ ID NOs.
Ab2	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTL TISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 210
Ab47	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTL TISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 211
Ab49	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTL TISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 212
Ab31	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTL TISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 213
Ab53	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTL TISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 214
Ab40	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTL TISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 215
Ab5	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTL TISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 216
Ab9	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTL TISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 217
Ab48	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTL TISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 218
Ab4	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTL TISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 219
Ab10	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTL TISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 220
Ab37	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTL TISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 221
Ab33	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTL TISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 222
Ab42	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTL TISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 223
Ab45	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTL TISSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 224

FIG 2C
(ARV) VH

clone	Vh	SEQ ID NOs.
Ab44	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMHWVRQAPGKGLEWVSAISSDGSYISYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYDVWFDYWGQGTLVTVSS	SEQ ID NO: 225
Ab97	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMHWVRQAPGKGLEWVAAISSNTGSIGYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYDVWIDYWGQGTLVTVSS	SEQ ID NO: 226
Ab81	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMHWVRQAPGKGLEWVASIKGNTGSSGYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYDVWIDYWGQGTLVTVSS	SEQ ID NO: 227
Ab188	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMHWVRQAPGKGLEWVASIKSNAGTSSYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYDVWIDYWGQGTLVTVSS	SEQ ID NO: 228
Ab186	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMHWVRQAPGKGLEWVASISSNAGYSSYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYDVWIDYWGQGTLVTVSS	SEQ ID NO: 229
Ab62	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMSWVRQAPGKGLEWVASISSSAGYSYYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYDVWIDYWGQGTLVTVSS	SEQ ID NO: 230
Ab57	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMHWVRQAPGKGLEWVAYIKSDTSTIGYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYDVWIDYWGQGTLVTVSS	SEQ ID NO: 231
Ab192	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMHWVRQAPGKGLEWVSSISSDTGYIGYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYDVWIDYWGQGTLVTVSS	SEQ ID NO: 232
Ab73	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMSWVRQAPGKGLEWVASIKGSAGSSSYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYDVWLDYWGQGTLVTVSS	SEQ ID NO: 233
Ab60	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMHWVRQAPGKGLEWVSSISSSAGYTSYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYDVWLDYWGQGTLVTVSS	SEQ ID NO: 234
Ab28	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMHWVRQAPGKGLEWVANINSNGGNTGYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYDVWMDYWGQGTLVTVSS	SEQ ID NO: 235
Ab32	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMHWVRQAPGKGLEWVANINSNGGNTGYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYDVWMDYWGQGTLVTVSS	SEQ ID NO: 236
Ab78	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMHWVRQAPGKGLEWVASISGSTSSSSYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYDVWMDYWGQGTLVTVSS	SEQ ID NO: 237
Ab14	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYGMHWVRQAPGKGLEWVSSISSSGGTKGYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYDVWMDYWGQGTLVTVSS	SEQ ID NO: 238
Ab152	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMHWVRQAPGKGLEWVTSISSNAGYISYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYDVWMDYWGQGTLVTVSS	SEQ ID NO: 239
Ab72	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMHWVRQAPGKGLEWVAAIKSDAGTSGYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYDYWIDYWGQGTLVTVSS	SEQ ID NO: 240
Ab137	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMHWVRQAPGKGLEWVASIKGNTGSISYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYDYWIDYWGQGTLVTVSS	SEQ ID NO: 241
Ab128	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMNWVRQAPGKGLEWVASIKGSASYTSYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYDYWIDYWGQGTLVTVSS	SEQ ID NO: 242
Ab169	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMHWVRQAPGKGLEWVASIKSDTSSTYYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYDYWIDYWGQGTLVTVSS	SEQ ID NO: 243
Ab87	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMSWVRQAPGKGLEWVASIKSSAGYISYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYDYWIDYWGQGTLVTVSS	SEQ ID NO: 244
Ab74	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMHWVRQAPGKGLEWVASISSNAGTTGYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYDYWIDYWGQGTLVTVSS	SEQ ID NO: 245
Ab172	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMHWVRQAPGKGLEWVSSIKSSAGYTYYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYDYWIDYWGQGTLVTVSS	SEQ ID NO: 246
Ab153	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMHWVRQAPGKGLEWVSSINSNAGTISYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYDYWIDYWGQGTLVTVSS	SEQ ID NO: 247
Ab120	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMNWVRQAPGKGLEWVSSINSNAGTIYYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYDYWIDYWGQGTLVTVSS	SEQ ID NO: 248
Ab13	EVQLLESGGGLVQPGGSLRLSCAASGFTFDSYSMHWVRQAPGKGLEWVSSINSNGGYKYYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYDYWIDYWGQGTLVTVSS	SEQ ID NO: 249
Ab113	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMNWVRQAPGKGLEWVTSISSSASTTGYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYDYWIDYWGQGTLVTVSS	SEQ ID NO: 250
Ab16	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMHWVRQAPGKGLEWVAAIKSSGSSTSYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYDYWLDYWGQGTLVTVSS	SEQ ID NO: 251

FIG 2C
(ARV) VH

clone	Vh	SEQ ID NOs.
Ab56	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMSWVRQAPGKGLEWVASINSNAGTISYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYDYWLDYWGQGTLVTVSS	SEQ ID NO: 252
Ab129	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMHWVRQAPGKGLEWVSSISSSAGTSGYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYDYWLDYWGQGTLVTVSS	SEQ ID NO: 253
Ab50	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMHWVRQAPGKGLEWVAAIKSNGGYIYYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYDYWMDYWGQGTLVTVSS	SEQ ID NO: 254
Ab90	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMHWVRQAPGKGLEWVAAISSNTGYIYYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYDYWMDYWGQGTLVTVSS	SEQ ID NO: 255
Ab99	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMSWVRQAPGKGLEWVAAISSSASTTSYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYDYWMDYWGQGTLVTVSS	SEQ ID NO: 256
Ab3	EVQLLESGGGLVQPGGSLRLSCAASGFTFSDYGMHWVRQAPGKGLEWVAGIWYNGGYKSYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYDYWMDYWGQGTLVTVSS	SEQ ID NO: 257
Ab148	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMSWVRQAPGKGLEWVASIKGSAGYIYYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYDYWMDYWGQGTLVTVSS	SEQ ID NO: 258
Ab124	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMHWVRQAPGKGLEWVASIKGSASYSYYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYDYWMDYWGQGTLVTVSS	SEQ ID NO: 259
Ab22	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMHWVRQAPGKGLEWVASIKSSGGSKYYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYDYWMDYWGQGTLVTVSS	SEQ ID NO: 260
Ab41	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMHWVRQAPGKGLEWVASIKSSGGYISYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYDYWMDYWGQGTLVTVSS	SEQ ID NO: 261
Ab119	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMSWVRQAPGKGLEWVASIKSSTGTISYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYDYWMDYWGQGTLVTVSS	SEQ ID NO: 262
Ab157	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMNWVRQAPGKGLEWVASINSNAGSTYYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYDYWMDYWGQGTLVTVSS	SEQ ID NO: 263
Ab27	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMXWVRQAPGKGLEWVASISSSGGSIYYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYDYWMDYWGQGTLVTVSS	SEQ ID NO: 264
Ab15	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMHWVRQAPGKGLEWVASIWSNSGNTGYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYDYWMDYWGQGTLVTVSS	SEQ ID NO: 265
Ab191	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMHWVRQAPGKGLEWVSSIKSSASYSSYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYDYWMDYWGQGTLVTVSS	SEQ ID NO: 266
Ab190	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMHWVRQAPGKGLEWVAAIKSSAGYSYYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYGVWIDYWGQGTLVTVSS	SEQ ID NO: 267
Ab79	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMHWVRQAPGKGLEWVADIKSNTGYTYYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYGVWIDYWGQGTLVTVSS	SEQ ID NO: 268
Ab181	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVASIKSSTGYTYYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYGVWIDYWGQGTLVTVSS	SEQ ID NO: 269
Ab146	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMHWVRQAPGKGLEWVASISGNAGSSSYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYGVWIDYWGQGTLVTVSS	SEQ ID NO: 270
Ab167	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMHWVRQAPGKGLEWVASISGNAGSSSYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYGVWIDYWGQGTLVTVSS	SEQ ID NO: 271
Ab88	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMSWVRQAPGKGLEWVASISSSAGTTSYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYGVWIDYWGQGTLVTVSS	SEQ ID NO: 272
Ab199	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMHWVRQAPGKGLEWVASISSSASTSGYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYGVWIDYWGQGTLVTVSS	SEQ ID NO: 273
Ab71	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMHWVRQAPGKGLEWVASISSSASTSYYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYGVWIDYWGQGTLVTVSS	SEQ ID NO: 274
Ab85	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVSAISGSGGSTYYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYGVWIDYWGQGTLVTVSS	SEQ ID NO: 275
Ab59	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMNWVRQAPGKGLEWVAAISGNAGSSSYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYGVWLDYWGQGTLVTVSS	SEQ ID NO: 276
Ab141	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVSAISGSGGSTYYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYGVWLDYWGQGTLVTVSS	SEQ ID NO: 277
Ab68	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMHWVRQAPGKGLEWVAAIKGNTGSTYYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYGVWMDYWGQGTLVTVSS	SEQ ID NO: 278

FIG 2C
(ARV) VH

clone	Vh	SEQ ID NOs.
Ab143	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMHWVRQAPGKGLEWVAAINSNAGSSSYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYGVWMDYWGQGTLVTVSS	SEQ ID NO: 279
Ab46	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMHWVRQAPGKGLEWVAGIWSSGGTTSYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYGVWMDYWGQGTLVTVSS	SEQ ID NO: 280
Ab197	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMHWVRQAPGKGLEWVAYIKGSAGSTSYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYGVWMDYWGQGTLVTVSS	SEQ ID NO: 281
Ab175	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMHWVRQAPGKGLEWVSAINSNAGSSSYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYGVWMDYWGQGTLVTVSS	SEQ ID NO: 282
Ab156	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVSYISGNAGYISYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYGVWMDYWGQGTLVTVSS	SEQ ID NO: 283
Ab63	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMHWVRQAPGKGLEWVASISGSTGTSYYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYGYWIDYWGQGTLVTVSS	SEQ ID NO: 284
Ab11	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYGMHWVRQAPGKGLEWVASISSNGGYTSYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYGYWIDYWGQGTLVTVSS	SEQ ID NO: 285
Ab182	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMHWVRQAPGKGLEWVASISSNTGTTGYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYGYWIDYWGQGTLVTVSS	SEQ ID NO: 286
Ab89	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMHWVRQAPGKGLEWVTSISSSTGYISYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYGYWIDYWGQGTLVTVSS	SEQ ID NO: 287
Ab8	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVADIKSNGGYTYYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYGYWLDYWGQGTLVTVSS	SEQ ID NO: 288
Ab101	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVADISGSAGTISYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYGYWLDYWGQGTLVTVSS	SEQ ID NO: 289
Ab25	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYGMHWVRQAPGKGLEWVAAIKSSGSSTSYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYGYWMDYWGQGTLVTVSS	SEQ ID NO: 290
Ab154	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMHWVRQAPGKGLEWVASIKSNTGTTGYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYGYWMDYWGQGTLVTVSS	SEQ ID NO: 291
Ab21	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVSAISGSGGSTYYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYGYWMDYWGQGTLVTVSS	SEQ ID NO: 292
Ab111	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMHWVRQAPGKGLEWVSAISGSGGSTYYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYGYWMDYWGQGTLVTVSS	SEQ ID NO: 293
Ab118	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVSSINSNAGTSYYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYGYWMDYWGQGTLVTVSS	SEQ ID NO: 294
Ab173	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVSSISSNTGTISYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYGYWMDYWGQGTLVTVSS	SEQ ID NO: 295
Ab38	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYTMSWVRQAPGKGLEWVAGIWSDSGNKGYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYSVWIDYWGQGTLVTVSS	SEQ ID NO: 296
Ab76	EVQLLESGGGLVQPGGSLRLSCAASGFTFDSYSMHWVRQAPGKGLEWVSAISGSGGSTYYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYSVWIDYWGQGTLVTVSS	SEQ ID NO: 297
Ab131	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVSDIKSSAGSTSYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYSVWIDYWGQGTLVTVSS	SEQ ID NO: 298
Ab1	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMHWVRQAPGKGLEWVSGISSNGGSTSYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYSVWIDYWGQGTLVTVSS	SEQ ID NO: 299
Ab67	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVASIKSSTGTTYYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYSVWLDYWGQGTLVTVSS	SEQ ID NO: 300
Ab70	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMNWVRQAPGKGLEWVASISSNTGTIGYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYSVWLDYWGQGTLVTVSS	SEQ ID NO: 301
Ab170	EVQLLESGGGLVQPGGSLRLSCAASGFTFNSYAMHWVRQAPGKGLEWVAYISGNAGSIYYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYSVWLDYWGQGTLVTVSS	SEQ ID NO: 302
Ab30	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYGMHWVRQAPGKGLEWVASIKSNSGNTGYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYSVWMDYWGQGTLVTVSS	SEQ ID NO: 303
Ab93	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVASISSSTGTISYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYSVWMDYWGQGTLVTVSS	SEQ ID NO: 304
Ab142	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMHWVRQAPGKGLEWVSAISGSGGSTYYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYSVWMDYWGQGTLVTVSS	SEQ ID NO: 305

FIG 2C
(ARV) VH

clone	Vh	SEQ ID NOs.
Ab104	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVSSISSSASYTGYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYSYWIDYWGQGTLVTVSS	SEQ ID NO: 306
Ab112	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVASISSNTGSIYYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYSYWLDYWGQGTLVTVSS	SEQ ID NO: 307
Ab35	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYGMHWVRQAPGKGLEWVASISSSSGYKYYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYSYWMDYWGQGTLVTVSS	SEQ ID NO: 308
Ab126	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMHWVRQAPGKGLEWVASISSSTGSIGYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCARVPYSYWMDYWGQGTLVTVSS	SEQ ID NO: 309
Ab125	EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYSMHWVRQAPGKGLEWVASIKGNAGTTYYADSVKGRFTISRDNS KNTLYLQMNSLRAEDTAVYYCAKVPYDVWMDYWGQGTLVTVSS	SEQ ID NO: 310

FIG 2C
(ARV) VL

clone	VL	SEQ ID NOs.
Ab44	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 311
Ab97	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 312
Ab81	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 313
Ab188	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 314
Ab186	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 315
Ab62	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 316
Ab57	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 317
Ab192	DIQMTQSPSSLSASVGDRVTITCRASQSISYYVNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 318
Ab73	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 319
Ab60	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 320
Ab28	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 321
Ab32	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 322
Ab78	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 323
Ab14	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 324
Ab152	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 325
Ab72	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 326
Ab137	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 327
Ab128	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 328
Ab169	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 329
Ab87	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 330
Ab74	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 331
Ab172	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 332
Ab153	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 333
Ab120	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 334
Ab13	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 335
Ab113	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 336
Ab16	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 337

FIG 2C
(ARV) VL

clone	VL	SEQ ID NOs.
Ab56	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 338
Ab129	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 339
Ab50	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 340
Ab90	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 341
Ab99	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 342
Ab3	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 343
Ab148	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 344
Ab124	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 345
Ab22	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 346
Ab41	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 347
Ab119	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 348
Ab157	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 349
Ab27	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 350
Ab15	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 351
Ab191	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 352
Ab190	DIQMTQSPSSLSASVGDRVTITCRASQSISYYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 353
Ab79	DIQMTQSPSSLSASVGDRVTITCRASQSISYYANWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 354
Ab181	DIQMTQSPSSLSASVGDRVTITCRASQSISYYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 355
Ab146	DIQMTQSPSSLSASVGDRVTITCRASQSISYYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 356
Ab167	DIQMTQSPSSLSASVGDRVTITCRASQSISYYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 357
Ab88	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 358
Ab199	DIQMTQSPSSLSASVGDRVTITCRASQSISYYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 359
Ab71	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 360
Ab85	DIQMTQSPSSLSASVGDRVTITCRASQSISYYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 361
Ab59	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 362
Ab141	DIQMTQSPSSLSASVGDRVTITCRASQSISYYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 363
Ab68	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 364

FIG 2C
(ARV) VL

clone	VL	SEQ ID NOs.
Ab143	DIQMTQSPSSLSASVGDRVTITCRASQSISYYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 365
Ab46	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 366
Ab197	DIQMTQSPSSLSASVGDRVTITCRASQSISYYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 367
Ab175	DIQMTQSPSSLSASVGDRVTITCRASQSISYYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 368
Ab156	DIQMTQSPSSLSASVGDRVTITCRASQSISSYAAWYQQKPGKAPKLLIYGNTSRQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQYSNSPLTFGGGTKVEIK	SEQ ID NO: 369
Ab63	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 370
Ab11	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 371
Ab182	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 372
Ab89	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 373
Ab8	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 374
Ab101	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 375
Ab25	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 376
Ab154	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 377
Ab21	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 378
Ab111	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 379
Ab118	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 380
Ab173	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 381
Ab38	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 382
Ab76	DIQMTQSPSSLSASVGDRVTITCRASQSISYYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 383
Ab131	DIQMTQSPSSLSASVGDRVTITCRASQSISYYVNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 384
Ab1	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 385
Ab67	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 386
Ab70	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 387
Ab170	DIQMTQSPSSLSASVGDRVTITCRASQSISYYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 388
Ab30	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 389
Ab93	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 390
Ab142	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 391

FIG 2C
(ARV) VL

clone	VL	SEQ ID NOs.
Ab104	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 392
Ab112	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 393
Ab35	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 394
Ab126	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 395
Ab125	DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTI SSLQPEDFATYYCQQSYSTPLTFGGGTKVEIK	SEQ ID NO: 396

FIG. 3A
(ARE) CDRs

clone	HCDR1	HCDR2	HCDR3	LCDR1	LCDR2	LCDR3
Ab58	SSYAMS	WVSSIKSSAGSSY	AREPYDVWID	SYYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 397	SEQ ID NO: 398	SEQ ID NO: 399	SEQ ID NO: 400	SEQ ID NO: 401	SEQ ID NO: 402
Ab69	SSYSMS	WVAAIKGSTSSSY	AREPYDVWLD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 403	SEQ ID NO: 404	SEQ ID NO: 405	SEQ ID NO: 406	SEQ ID NO: 407	SEQ ID NO: 408
Ab75	SSYSMS	WVAAIKSNAGTSS	AREPYDVWLD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 409	SEQ ID NO: 410	SEQ ID NO: 411	SEQ ID NO: 412	SEQ ID NO: 413	SEQ ID NO: 414
Ab133	SSYAMS	WVSSISSNTGSIS	AREPYDVWLD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 415	SEQ ID NO: 416	SEQ ID NO: 417	SEQ ID NO: 418	SEQ ID NO: 419	SEQ ID NO: 420
Ab177	SSYSMS	WVADISSSASTIG	AREPYDVWMD	SYYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 421	SEQ ID NO: 422	SEQ ID NO: 423	SEQ ID NO: 424	SEQ ID NO: 425	SEQ ID NO: 426
Ab122	SSYSMS	WVSAISGSGGSTY	AREPYDVWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 427	SEQ ID NO: 428	SEQ ID NO: 429	SEQ ID NO: 430	SEQ ID NO: 431	SEQ ID NO: 432
Ab86	SSYSMS	WVSSISSNTGTSY	AREPYDVWMD	SYYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 433	SEQ ID NO: 434	SEQ ID NO: 435	SEQ ID NO: 436	SEQ ID NO: 437	SEQ ID NO: 438
Ab180	SSYSMS	WVSSISSNTGTSY	AREPYDVWMD	SYYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 439	SEQ ID NO: 440	SEQ ID NO: 441	SEQ ID NO: 442	SEQ ID NO: 443	SEQ ID NO: 444
Ab83	SSYSMS	WVAAISGSAGTSG	AREPYDYWLD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 445	SEQ ID NO: 446	SEQ ID NO: 447	SEQ ID NO: 448	SEQ ID NO: 449	SEQ ID NO: 450
Ab26	SSYSMS	WVADIKSSGSTKS	AREPYDYWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 451	SEQ ID NO: 452	SEQ ID NO: 453	SEQ ID NO: 454	SEQ ID NO: 455	SEQ ID NO: 456
Ab20	SSYAMS	WVSAISGSGGSTY	AREPYDYWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 457	SEQ ID NO: 458	SEQ ID NO: 459	SEQ ID NO: 460	SEQ ID NO: 461	SEQ ID NO: 462
Ab147	SSYAMS	WVSAISGSGGSTY	AREPYDYWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 463	SEQ ID NO: 464	SEQ ID NO: 465	SEQ ID NO: 466	SEQ ID NO: 467	SEQ ID NO: 468
Ab12	SSYAMS	WVASINSNGGYKS	AREPYGTWLD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 469	SEQ ID NO: 470	SEQ ID NO: 471	SEQ ID NO: 472	SEQ ID NO: 473	SEQ ID NO: 474
Ab66	SSYAMS	WVSAISGSGGSTY	AREPYGVWID	SYYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 475	SEQ ID NO: 476	SEQ ID NO: 477	SEQ ID NO: 478	SEQ ID NO: 479	SEQ ID NO: 480
Ab176	SSYSMN	WVASIKGSASTIY	AREPYGVWLD	SYYVNWF	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 481	SEQ ID NO: 482	SEQ ID NO: 483	SEQ ID NO: 484	SEQ ID NO: 485	SEQ ID NO: 486
Ab96	SSYAMS	WVASIKSNTGSSS	AREPYGVWLD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 487	SEQ ID NO: 488	SEQ ID NO: 489	SEQ ID NO: 490	SEQ ID NO: 491	SEQ ID NO: 492
Ab123	SSYSMS	WVASISSSAGTSS	AREPYGVWLD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 493	SEQ ID NO: 494	SEQ ID NO: 495	SEQ ID NO: 496	SEQ ID NO: 497	SEQ ID NO: 498
Ab109	SSYAMS	WVAYINSNTGTIY	AREPYGVWLD	SSYLNWY	LLIYAASSLQ	QQSYSTPL

FIG. 3A
(ARE) CDRs

clone	HCDR1	HCDR2	HCDR3	LCDR1	LCDR2	LCDR3
	SEQ ID NO: 499	SEQ ID NO: 500	SEQ ID NO: 501	SEQ ID NO: 502	SEQ ID NO: 503	SEQ ID NO: 504
Ab149	SSYAMS	WVAYISGNTGYIG	AREPYGVWLD	SSYANWY	LVIYGNSSRE	QQSGDSNL
	SEQ ID NO: 505	SEQ ID NO: 506	SEQ ID NO: 507	SEQ ID NO: 508	SEQ ID NO: 509	SEQ ID NO: 510
Ab34	SSYAMS	WVSAISGSGGSTY	AREPYGVWLD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 511	SEQ ID NO: 512	SEQ ID NO: 513	SEQ ID NO: 514	SEQ ID NO: 515	SEQ ID NO: 516
Ab61	SSYAMS	WVSAISGSGGSTY	AREPYGVWLD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 517	SEQ ID NO: 518	SEQ ID NO: 519	SEQ ID NO: 520	SEQ ID NO: 521	SEQ ID NO: 522
Ab64	SSYSMS	WVSAISSNAGSTS	AREPYGVWLD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 523	SEQ ID NO: 524	SEQ ID NO: 525	SEQ ID NO: 526	SEQ ID NO: 527	SEQ ID NO: 528
Ab105	SSYSMS	WVSSINSNAGTTY	AREPYGVWLD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 529	SEQ ID NO: 530	SEQ ID NO: 531	SEQ ID NO: 532	SEQ ID NO: 533	SEQ ID NO: 534
Ab108	SSYSMS	WVSSINSNAGTTY	AREPYGVWLD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 535	SEQ ID NO: 536	SEQ ID NO: 537	SEQ ID NO: 538	SEQ ID NO: 539	SEQ ID NO: 540
Ab178	DSYSMN	WVAAIKSDASTIG	AREPYGVWMD	SYYVNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 541	SEQ ID NO: 542	SEQ ID NO: 543	SEQ ID NO: 544	SEQ ID NO: 545	SEQ ID NO: 546
Ab166	SSYSMN	WVAAISGSTGTIS	AREPYGVWMD	SYYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 547	SEQ ID NO: 548	SEQ ID NO: 549	SEQ ID NO: 550	SEQ ID NO: 551	SEQ ID NO: 552
Ab29	SSYGMN	WVANINSNSGSIY	AREPYGVWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 553	SEQ ID NO: 554	SEQ ID NO: 555	SEQ ID NO: 556	SEQ ID NO: 557	SEQ ID NO: 558
Ab135	DSYAMN	WVASINSNTGSIY	AREPYGVWMD	SYYANWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 559	SEQ ID NO: 560	SEQ ID NO: 561	SEQ ID NO: 562	SEQ ID NO: 563	SEQ ID NO: 564
Ab171	DSYAMN	WVASINSNTGSIY	AREPYGVWMD	SYYANWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 565	SEQ ID NO: 566	SEQ ID NO: 567	SEQ ID NO: 568	SEQ ID NO: 569	SEQ ID NO: 570
Ab194	SSYSMS	WVSAINGNAGSIG	AREPYGVWMD	SYYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 571	SEQ ID NO: 572	SEQ ID NO: 573	SEQ ID NO: 574	SEQ ID NO: 575	SEQ ID NO: 576
Ab184	SSYAMS	WVSAISGSGGSTY	AREPYGVWMD	SYYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 577	SEQ ID NO: 578	SEQ ID NO: 579	SEQ ID NO: 580	SEQ ID NO: 581	SEQ ID NO: 582
Ab164	SSYAMS	WVSYINSNTGSIG	AREPYGVWMD	SYYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 583	SEQ ID NO: 584	SEQ ID NO: 585	SEQ ID NO: 586	SEQ ID NO: 587	SEQ ID NO: 588
Ab183	SSYAMS	WVSYINSNTGSIG	AREPYGVWMD	SYYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 589	SEQ ID NO: 590	SEQ ID NO: 591	SEQ ID NO: 592	SEQ ID NO: 593	SEQ ID NO: 594
Ab158	SSYSMS	WVAAIKGSAGTSG	AREPYGYWLD	SSYVAWY	LLIYGNTSLQ	QQGDENPL
	SEQ ID NO: 595	SEQ ID NO: 596	SEQ ID NO: 597	SEQ ID NO: 598	SEQ ID NO: 599	SEQ ID NO: 600
Ab55	SSYAMS	WVASISGNTGTSS	AREPYGYWLD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 601	SEQ ID NO: 602	SEQ ID NO: 603	SEQ ID NO: 604	SEQ ID NO: 605	SEQ ID NO: 606
Ab136	SSYAMS	WVSAISGSGGSTY	AREPYGYWLD	SSYLNWY	LLIYAASSLQ	QQSYSTPL

FIG. 3A
(ARE) CDRs

clone	HCDR1	HCDR2	HCDR3	LCDR1	LCDR2	LCDR3
	SEQ ID NO: 607	SEQ ID NO: 608	SEQ ID NO: 609	SEQ ID NO: 610	SEQ ID NO: 611	SEQ ID NO: 612
Ab39	SSYAMS	WVSSIWSNGGSIY	AREPYGYWLD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 613	SEQ ID NO: 614	SEQ ID NO: 615	SEQ ID NO: 616	SEQ ID NO: 617	SEQ ID NO: 618
Ab159	SSYSMN	WVASIKSSTGTTG	AREPYGYWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 619	SEQ ID NO: 620	SEQ ID NO: 621	SEQ ID NO: 622	SEQ ID NO: 623	SEQ ID NO: 624
Ab151	SSYAMS	WVASIKSSTGYIS	AREPYGYWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 625	SEQ ID NO: 626	SEQ ID NO: 627	SEQ ID NO: 628	SEQ ID NO: 629	SEQ ID NO: 630
Ab139	SSYSMS	WVASISGSASYSY	AREPYGYWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 631	SEQ ID NO: 632	SEQ ID NO: 633	SEQ ID NO: 634	SEQ ID NO: 635	SEQ ID NO: 636
Ab107	SSYSMS	WVSDIKSSAGSTY	AREPYGYWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 637	SEQ ID NO: 638	SEQ ID NO: 639	SEQ ID NO: 640	SEQ ID NO: 641	SEQ ID NO: 642
Ab36	SSYAMS	WVASIKSSGSYKS	AREPYSTWLD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 643	SEQ ID NO: 644	SEQ ID NO: 645	SEQ ID NO: 646	SEQ ID NO: 647	SEQ ID NO: 648
Ab193	SSYAMS	WVSAIKSDTSTIY	AREPYSTWLD	SYYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 649	SEQ ID NO: 650	SEQ ID NO: 651	SEQ ID NO: 652	SEQ ID NO: 653	SEQ ID NO: 654
Ab115	SSYAMS	WVAAIKGNAGSTS	AREPYSTWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 655	SEQ ID NO: 656	SEQ ID NO: 657	SEQ ID NO: 658	SEQ ID NO: 659	SEQ ID NO: 660
Ab106	SSYAMN	WVASIKSSTGTIS	AREPYSVWID	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 661	SEQ ID NO: 662	SEQ ID NO: 663	SEQ ID NO: 664	SEQ ID NO: 665	SEQ ID NO: 666
Ab138	SSYAMS	WVASIKSSTGTTG	AREPYSVWID	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 667	SEQ ID NO: 668	SEQ ID NO: 669	SEQ ID NO: 670	SEQ ID NO: 671	SEQ ID NO: 672
Ab127	SSYAMN	WVAYIKSDTGSIG	AREPYSVWID	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 673	SEQ ID NO: 674	SEQ ID NO: 675	SEQ ID NO: 676	SEQ ID NO: 677	SEQ ID NO: 678
Ab165	SSYAMS	WVAAIKSSTGTIY	AREPYSVWLD	IYYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 679	SEQ ID NO: 680	SEQ ID NO: 681	SEQ ID NO: 682	SEQ ID NO: 683	SEQ ID NO: 684
Ab155	SSYSMN	WVAAISGDTGTSG	AREPYSVWLD	SYYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 685	SEQ ID NO: 686	SEQ ID NO: 687	SEQ ID NO: 688	SEQ ID NO: 689	SEQ ID NO: 690
Ab19	SSYSMS	WVANIKSNSGYTY	AREPYSVWLD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 691	SEQ ID NO: 692	SEQ ID NO: 693	SEQ ID NO: 694	SEQ ID NO: 695	SEQ ID NO: 696
Ab6	SDYSMS	WVARISSSSSYKS	AREPYSVWLD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 697	SEQ ID NO: 698	SEQ ID NO: 699	SEQ ID NO: 700	SEQ ID NO: 701	SEQ ID NO: 702
Ab187	SSYSMS	WVASIKSDASTTG	AREPYSVWLD	SYYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 703	SEQ ID NO: 704	SEQ ID NO: 705	SEQ ID NO: 706	SEQ ID NO: 707	SEQ ID NO: 708
Ab179	SSYAMS	WVASIKSNTGSTY	AREPYSVWLD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 709	SEQ ID NO: 710	SEQ ID NO: 711	SEQ ID NO: 712	SEQ ID NO: 713	SEQ ID NO: 714
Ab65	SSYAMS	WVAYIKSNTGSIS	AREPYSVWLD	SSYLNWY	LLIYAASSLQ	QQSYSTPL

FIG. 3A
(ARE) CDRs

clone	HCDR1	HCDR2	HCDR3	LCDR1	LCDR2	LCDR3
	SEQ ID NO: 715	SEQ ID NO: 716	SEQ ID NO: 717	SEQ ID NO: 718	SEQ ID NO: 719	SEQ ID NO: 720
Ab114	SSYSMS	WVAYISSNTGSTY	AREPYSVWLD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 721	SEQ ID NO: 722	SEQ ID NO: 723	SEQ ID NO: 724	SEQ ID NO: 725	SEQ ID NO: 726
Ab102	SSYAMS	WVSAINSNAGYTY	AREPYSVWLD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 727	SEQ ID NO: 728	SEQ ID NO: 729	SEQ ID NO: 730	SEQ ID NO: 731	SEQ ID NO: 732
Ab94	SSYAMS	WVSAISGSGGSTY	AREPYSVWLD	SYYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 733	SEQ ID NO: 734	SEQ ID NO: 735	SEQ ID NO: 736	SEQ ID NO: 737	SEQ ID NO: 738
Ab163	SSYAMS	WVSAISGSGGSTY	AREPYSVWLD	SYYANWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 739	SEQ ID NO: 740	SEQ ID NO: 741	SEQ ID NO: 742	SEQ ID NO: 743	SEQ ID NO: 744
Ab110	SSYAMS	WVSSIKSNTGSTY	AREPYSVWLD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 745	SEQ ID NO: 746	SEQ ID NO: 747	SEQ ID NO: 748	SEQ ID NO: 749	SEQ ID NO: 750
Ab80	SSYSMS	WVSSIKSSTGSTY	AREPYSVWLD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 751	SEQ ID NO: 752	SEQ ID NO: 753	SEQ ID NO: 754	SEQ ID NO: 755	SEQ ID NO: 756
Ab92	SSYAMS	WVAAIKSSASTIY	AREPYSVWMD	SYYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 757	SEQ ID NO: 758	SEQ ID NO: 759	SEQ ID NO: 760	SEQ ID NO: 761	SEQ ID NO: 762
Ab117	SSYAMS	WVAAIKSSASTIY	AREPYSVWMD	SYYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 763	SEQ ID NO: 764	SEQ ID NO: 765	SEQ ID NO: 766	SEQ ID NO: 767	SEQ ID NO: 768
Ab162	SSYAMS	WVAAIKSSASTIY	AREPYSVWMD	SYYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 769	SEQ ID NO: 770	SEQ ID NO: 771	SEQ ID NO: 772	SEQ ID NO: 773	SEQ ID NO: 774
Ab121	SSYAMN	WVAAISSSAGTSS	AREPYSVWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 775	SEQ ID NO: 776	SEQ ID NO: 777	SEQ ID NO: 778	SEQ ID NO: 779	SEQ ID NO: 780
Ab195	SSYAMS	WVADISGSASSSY	AREPYSVWMD	SYYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 781	SEQ ID NO: 782	SEQ ID NO: 783	SEQ ID NO: 784	SEQ ID NO: 785	SEQ ID NO: 786
Ab84	SSYAMS	WVASIKSSTGTSY	AREPYSVWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 787	SEQ ID NO: 788	SEQ ID NO: 789	SEQ ID NO: 790	SEQ ID NO: 791	SEQ ID NO: 792
Ab161	SSYSMS	WVASIKSSTGYTS	AREPYSVWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 793	SEQ ID NO: 794	SEQ ID NO: 795	SEQ ID NO: 796	SEQ ID NO: 797	SEQ ID NO: 798
Ab198	SSYAMS	WVASIKSSTSSTY	AREPYSVWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 799	SEQ ID NO: 800	SEQ ID NO: 801	SEQ ID NO: 802	SEQ ID NO: 803	SEQ ID NO: 804
Ab24	SSYAMS	WVSAISGSGGSTY	AREPYSVWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 805	SEQ ID NO: 806	SEQ ID NO: 807	SEQ ID NO: 808	SEQ ID NO: 809	SEQ ID NO: 810
Ab98	SSYAMS	WVSAISGSGGSTY	AREPYSVWMD	SYYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 811	SEQ ID NO: 812	SEQ ID NO: 813	SEQ ID NO: 814	SEQ ID NO: 815	SEQ ID NO: 816
Ab116	SSYAMS	WVSAISGSGGSTY	AREPYSVWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 817	SEQ ID NO: 818	SEQ ID NO: 819	SEQ ID NO: 820	SEQ ID NO: 821	SEQ ID NO: 822
Ab174	SSYAMS	WVSAISGSGGSTY	AREPYSVWMD	SYYLNWY	LLIYAASSLQ	QQSYSTPL

FIG. 3A
(ARE) CDRs

clone	HCDR1	HCDR2	HCDR3	LCDR1	LCDR2	LCDR3
	SEQ ID NO: 823	SEQ ID NO: 824	SEQ ID NO: 825	SEQ ID NO: 826	SEQ ID NO: 827	SEQ ID NO: 828
Ab196	SSYSMN	WVSSIKGSAGTTS	AREPYSVWMD	SYYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 829	SEQ ID NO: 830	SEQ ID NO: 831	SEQ ID NO: 832	SEQ ID NO: 833	SEQ ID NO: 834
Ab51	SSYAMS	WVSSIKSNSGSKS	AREPYSVWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 835	SEQ ID NO: 836	SEQ ID NO: 837	SEQ ID NO: 838	SEQ ID NO: 839	SEQ ID NO: 840
Ab91	SSYSMS	WVAAIKGSAGSSS	AREPYSYWLD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 841	SEQ ID NO: 842	SEQ ID NO: 843	SEQ ID NO: 844	SEQ ID NO: 845	SEQ ID NO: 846
Ab185	SSYAMS	WVAAIKSNAGSSY	AREPYSYWLD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 847	SEQ ID NO: 848	SEQ ID NO: 849	SEQ ID NO: 850	SEQ ID NO: 851	SEQ ID NO: 852
Ab23	SSYAMS	WVARINSDSSNTY	AREPYSYWLD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 853	SEQ ID NO: 854	SEQ ID NO: 855	SEQ ID NO: 856	SEQ ID NO: 857	SEQ ID NO: 858
Ab7	SSYAMS	WVASIKSSSSSIS	AREPYSYWLD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 859	SEQ ID NO: 860	SEQ ID NO: 861	SEQ ID NO: 862	SEQ ID NO: 863	SEQ ID NO: 864
Ab95	SSYAMS	WVASIKSSTGYIG	AREPYSYWLD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 865	SEQ ID NO: 866	SEQ ID NO: 867	SEQ ID NO: 868	SEQ ID NO: 869	SEQ ID NO: 870
Ab100	SSYAMS	WVASINGNAGTIS	AREPYSYWLD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 871	SEQ ID NO: 872	SEQ ID NO: 873	SEQ ID NO: 874	SEQ ID NO: 875	SEQ ID NO: 876
Ab140	SSYAMS	WVASINSNTGSIG	AREPYSYWLD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 877	SEQ ID NO: 878	SEQ ID NO: 879	SEQ ID NO: 880	SEQ ID NO: 881	SEQ ID NO: 882
Ab145	SSYAMS	WVASISSSTGYTS	AREPYSYWLD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 883	SEQ ID NO: 884	SEQ ID NO: 885	SEQ ID NO: 886	SEQ ID NO: 887	SEQ ID NO: 888
Ab150	SSYAMS	WVSAISGSGGSTY	AREPYSYWLD	SSYVAWY	LLIYVNTSRA	QQWYEFNL
	SEQ ID NO: 889	SEQ ID NO: 890	SEQ ID NO: 891	SEQ ID NO: 892	SEQ ID NO: 893	SEQ ID NO: 894
Ab168	SSYAMS	WVSSIKSDTSSTY	AREPYSYWLD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 895	SEQ ID NO: 896	SEQ ID NO: 897	SEQ ID NO: 898	SEQ ID NO: 899	SEQ ID NO: 900
Ab54	SSYAMS	WVSSIKSNTGSTS	AREPYSYWLD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 901	SEQ ID NO: 902	SEQ ID NO: 903	SEQ ID NO: 904	SEQ ID NO: 905	SEQ ID NO: 906
Ab77	SSYSMN	WVAAISGNTGYTY	AREPYSYWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 907	SEQ ID NO: 908	SEQ ID NO: 909	SEQ ID NO: 910	SEQ ID NO: 911	SEQ ID NO: 912
Ab43	SSYAMS	WVANIKSNSGYTS	AREPYSYWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 913	SEQ ID NO: 914	SEQ ID NO: 915	SEQ ID NO: 916	SEQ ID NO: 917	SEQ ID NO: 918
Ab160	DSYAMN	WVASIKSNAGYSS	AREPYSYWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 919	SEQ ID NO: 920	SEQ ID NO: 921	SEQ ID NO: 922	SEQ ID NO: 923	SEQ ID NO: 924
Ab82	SSYAMN	WVASIKSNTGTTG	AREPYSYWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 925	SEQ ID NO: 926	SEQ ID NO: 927	SEQ ID NO: 928	SEQ ID NO: 929	SEQ ID NO: 930
Ab189	SSYSMS	WVASIKSSASYSS	AREPYSYWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL

FIG. 3A
(ARE) CDRs

clone	HCDR1	HCDR2	HCDR3	LCDR1	LCDR2	LCDR3
	SEQ ID NO: 931	SEQ ID NO: 932	SEQ ID NO: 933	SEQ ID NO: 934	SEQ ID NO: 935	SEQ ID NO: 936
Ab17	SSYAMS	WVASIKSSGGNTY	AREPYSYWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 937	SEQ ID NO: 938	SEQ ID NO: 939	SEQ ID NO: 940	SEQ ID NO: 941	SEQ ID NO: 942
Ab103	SSYAMS	WVASIKSSTSSTY	AREPYSYWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 943	SEQ ID NO: 944	SEQ ID NO: 945	SEQ ID NO: 946	SEQ ID NO: 947	SEQ ID NO: 948
Ab18	SSYAMS	WVASISSSGGNTY	AREPYSYWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 949	SEQ ID NO: 950	SEQ ID NO: 951	SEQ ID NO: 952	SEQ ID NO: 953	SEQ ID NO: 954
Ab130	SSYAMS	WVSAISGSGGSTY	AREPYSYWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 955	SEQ ID NO: 956	SEQ ID NO: 957	SEQ ID NO: 958	SEQ ID NO: 959	SEQ ID NO: 960
Ab132	SSYAMN	WVSSISGNAGSIY	AREPYSYWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 961	SEQ ID NO: 962	SEQ ID NO: 963	SEQ ID NO: 964	SEQ ID NO: 965	SEQ ID NO: 966
Ab134	SSYAMN	WVSSISGNAGSIY	AREPYSYWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 967	SEQ ID NO: 968	SEQ ID NO: 969	SEQ ID NO: 970	SEQ ID NO: 971	SEQ ID NO: 972
Ab144	SSYAMN	WVSSISGNAGSIY	AREPYSYWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 973	SEQ ID NO: 974	SEQ ID NO: 975	SEQ ID NO: 976	SEQ ID NO: 977	SEQ ID NO: 978

FIG. 3B
(ARG) CDRs

clone	HCDR1	HCDR2	HCDR3	LCDR1	LCDR2	LCDR3
Ab2	SSYGMN	WVAGINYSSGNKY	ARGPYASTWLD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 979	SEQ ID NO: 980	SEQ ID NO: 981	SEQ ID NO: 982	SEQ ID NO: 983	SEQ ID NO: 984
Ab47	SSYSMN	WVASIKSSSSYTS	ARGPYDTWLD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 985	SEQ ID NO: 986	SEQ ID NO: 987	SEQ ID NO: 988	SEQ ID NO: 989	SEQ ID NO: 990
Ab49	SSYSMH	WVASIKSSGGYKS	ARGPYDVWID	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 991	SEQ ID NO: 992	SEQ ID NO: 993	SEQ ID NO: 994	SEQ ID NO: 995	SEQ ID NO: 996
Ab31	SSYTMH	WVANIKSSSSTKY	ARGPYDVWLD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 997	SEQ ID NO: 998	SEQ ID NO: 999	SEQ ID NO: 1000	SEQ ID NO: 1001	SEQ ID NO: 1002
Ab53	SSYSMH	WVASIKSSSSNKY	ARGPYDVWLD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1003	SEQ ID NO: 1004	SEQ ID NO: 1005	SEQ ID NO: 1006	SEQ ID NO: 1007	SEQ ID NO: 1008
Ab40	SSYGMN	WVAGIKYSSGNKY	ARGPYDVWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1009	SEQ ID NO: 1010	SEQ ID NO: 1011	SEQ ID NO: 1012	SEQ ID NO: 1013	SEQ ID NO: 1014
Ab5	SDYSMN	WVALIKSNSGSTS	ARGPYDVWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1015	SEQ ID NO: 1016	SEQ ID NO: 1017	SEQ ID NO: 1018	SEQ ID NO: 1019	SEQ ID NO: 1020
Ab9	DSYSMH	WVANIKSSGGYIS	ARGPYDVWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1021	SEQ ID NO: 1022	SEQ ID NO: 1023	SEQ ID NO: 1024	SEQ ID NO: 1025	SEQ ID NO: 1026
Ab48	SSYSMN	WVANIKSSGSSTS	ARGPYDVWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1027	SEQ ID NO: 1028	SEQ ID NO: 1029	SEQ ID NO: 1030	SEQ ID NO: 1031	SEQ ID NO: 1032
Ab4	DSYGMN	WVASIKYSSGYKY	ARGPYDVWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1033	SEQ ID NO: 1034	SEQ ID NO: 1035	SEQ ID NO: 1036	SEQ ID NO: 1037	SEQ ID NO: 1038
Ab10	SSYSMN	WVAYIKSNSGTKG	ARGPYDYWLD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1039	SEQ ID NO: 1040	SEQ ID NO: 1041	SEQ ID NO: 1042	SEQ ID NO: 1043	SEQ ID NO: 1044
Ab37	SSYGMN	WVSDINSNSGSTS	ARGPYGVWLD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1045	SEQ ID NO: 1046	SEQ ID NO: 1047	SEQ ID NO: 1048	SEQ ID NO: 1049	SEQ ID NO: 1050
Ab33	SSYGMH	WVSDISSNGGTIY	ARGPYGVWLD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1051	SEQ ID NO: 1052	SEQ ID NO: 1053	SEQ ID NO: 1054	SEQ ID NO: 1055	SEQ ID NO: 1056
Ab42	SSYGMH	WVARINSNGGSKS	ARGPYGYWFD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1057	SEQ ID NO: 1058	SEQ ID NO: 1059	SEQ ID NO: 1060	SEQ ID NO: 1061	SEQ ID NO: 1062
Ab45	SSYGMN	WVARISSSGSYIG	ARGPYGYWLD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1063	SEQ ID NO: 1064	SEQ ID NO: 1065	SEQ ID NO: 1066	SEQ ID NO: 1067	SEQ ID NO: 1068

FIG. 3C
(ARV) CDRs

clone	HCDR1	HCDR2	HCDR3	LCDR1	LCDR2	LCDR3
Ab44	SSYSMH	WVSAISSDGSYIS	ARVPYDVWFD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1069	SEQ ID NO: 1070	SEQ ID NO: 1071	SEQ ID NO: 1072	SEQ ID NO: 1073	SEQ ID NO: 1074
Ab97	SSYSMH	WVAAISSNTGSIG	ARVPYDVWID	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1075	SEQ ID NO: 1076	SEQ ID NO: 1077	SEQ ID NO: 1078	SEQ ID NO: 1079	SEQ ID NO: 1080
Ab81	SSYSMH	WVASIKGNTGSSG	ARVPYDVWID	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1081	SEQ ID NO: 1082	SEQ ID NO: 1083	SEQ ID NO: 1084	SEQ ID NO: 1085	SEQ ID NO: 1086
Ab188	SSYSMH	WVASIKSNAGTSS	ARVPYDVWID	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1087	SEQ ID NO: 1088	SEQ ID NO: 1089	SEQ ID NO: 1090	SEQ ID NO: 1091	SEQ ID NO: 1092
Ab186	SSYSMH	WVASISSNAGYSS	ARVPYDVWID	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1093	SEQ ID NO: 1094	SEQ ID NO: 1095	SEQ ID NO: 1096	SEQ ID NO: 1097	SEQ ID NO: 1098
Ab62	SSYSMS	WVASISSSAGYSY	ARVPYDVWID	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1099	SEQ ID NO: 1100	SEQ ID NO: 1101	SEQ ID NO: 1102	SEQ ID NO: 1103	SEQ ID NO: 1104
Ab57	SSYSMH	WVAYIKSDTSTIG	ARVPYDVWID	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1105	SEQ ID NO: 1106	SEQ ID NO: 1107	SEQ ID NO: 1108	SEQ ID NO: 1109	SEQ ID NO: 1110
Ab192	SSYAMH	WVSSISSDTGYIG	ARVPYDVWID	SYYVNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1111	SEQ ID NO: 1112	SEQ ID NO: 1113	SEQ ID NO: 1114	SEQ ID NO: 1115	SEQ ID NO: 1116
Ab73	SSYSMS	WVASIKGSAGSSS	ARVPYDVWLD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1117	SEQ ID NO: 1118	SEQ ID NO: 1119	SEQ ID NO: 1120	SEQ ID NO: 1121	SEQ ID NO: 1122
Ab60	SSYSMH	WVSSISSSAGYTS	ARVPYDVWLD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1123	SEQ ID NO: 1124	SEQ ID NO: 1125	SEQ ID NO: 1126	SEQ ID NO: 1127	SEQ ID NO: 1128
Ab28	SSYSMH	WVANINSNGGNTG	ARVPYDVWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1129	SEQ ID NO: 1130	SEQ ID NO: 1131	SEQ ID NO: 1132	SEQ ID NO: 1133	SEQ ID NO: 1134
Ab32	SSYSMH	WVANINSNGGNTG	ARVPYDVWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1135	SEQ ID NO: 1136	SEQ ID NO: 1137	SEQ ID NO: 1138	SEQ ID NO: 1139	SEQ ID NO: 1140
Ab78	SSYSMH	WVASISGSTSSSS	ARVPYDVWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1141	SEQ ID NO: 1142	SEQ ID NO: 1143	SEQ ID NO: 1144	SEQ ID NO: 1145	SEQ ID NO: 1146
Ab14	SSYGMH	WVSSISSSGGTKG	ARVPYDVWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1147	SEQ ID NO: 1148	SEQ ID NO: 1149	SEQ ID NO: 1150	SEQ ID NO: 1151	SEQ ID NO: 1152
Ab152	SSYSMH	WVTSISSNAGYIS	ARVPYDVWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1153	SEQ ID NO: 1154	SEQ ID NO: 1155	SEQ ID NO: 1156	SEQ ID NO: 1157	SEQ ID NO: 1158
Ab72	SSYSMH	WVAAIKSDAGTSG	ARVPYDYWID	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1159	SEQ ID NO: 1160	SEQ ID NO: 1161	SEQ ID NO: 1162	SEQ ID NO: 1163	SEQ ID NO: 1164
Ab137	SSYSMH	WVASIKGNTGSIS	ARVPYDYWID	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1165	SEQ ID NO: 1166	SEQ ID NO: 1167	SEQ ID NO: 1168	SEQ ID NO: 1169	SEQ ID NO: 1170
Ab128	SSYSMN	WVASIKGSASYTS	ARVPYDYWID	SSYLNWY	LLIYAASSLQ	QQSYSTPL

FIG. 3C
(ARV) CDRs

clone	HCDR1	HCDR2	HCDR3	LCDR1	LCDR2	LCDR3
	SEQ ID NO: 1171	SEQ ID NO: 1172	SEQ ID NO: 1173	SEQ ID NO: 1174	SEQ ID NO: 1175	SEQ ID NO: 1176
Ab169	SSYSMH	WVASIKSDTSSTY	ARVPYDYWID	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1177	SEQ ID NO: 1178	SEQ ID NO: 1179	SEQ ID NO: 1180	SEQ ID NO: 1181	SEQ ID NO: 1182
Ab87	SSYSMS	WVASIKSSAGYIS	ARVPYDYWID	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1183	SEQ ID NO: 1184	SEQ ID NO: 1185	SEQ ID NO: 1186	SEQ ID NO: 1187	SEQ ID NO: 1188
Ab74	SSYSMH	WVASISSNAGTTG	ARVPYDYWID	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1189	SEQ ID NO: 1190	SEQ ID NO: 1191	SEQ ID NO: 1192	SEQ ID NO: 1193	SEQ ID NO: 1194
Ab172	SSYSMH	WVSSIKSSAGYTY	ARVPYDYWID	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1195	SEQ ID NO: 1196	SEQ ID NO: 1197	SEQ ID NO: 1198	SEQ ID NO: 1199	SEQ ID NO: 1200
Ab153	SSYSMH	WVSSINSNAGTIS	ARVPYDYWID	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1201	SEQ ID NO: 1202	SEQ ID NO: 1203	SEQ ID NO: 1204	SEQ ID NO: 1205	SEQ ID NO: 1206
Ab120	SSYSMN	WVSSINSNAGTIY	ARVPYDYWID	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1207	SEQ ID NO: 1208	SEQ ID NO: 1209	SEQ ID NO: 1210	SEQ ID NO: 1211	SEQ ID NO: 1212
Ab13	DSYSMH	WVSSINSNGGYKY	ARVPYDYWID	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1213	SEQ ID NO: 1214	SEQ ID NO: 1215	SEQ ID NO: 1216	SEQ ID NO: 1217	SEQ ID NO: 1218
Ab113	SSYSMN	WVTSISSSASTTG	ARVPYDYWID	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1219	SEQ ID NO: 1220	SEQ ID NO: 1221	SEQ ID NO: 1222	SEQ ID NO: 1223	SEQ ID NO: 1224
Ab16	SSYSMH	WVAAIKSSGSSTS	ARVPYDYWLD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1225	SEQ ID NO: 1226	SEQ ID NO: 1227	SEQ ID NO: 1228	SEQ ID NO: 1229	SEQ ID NO: 1230
Ab56	SSYSMS	WVASINSNAGTIS	ARVPYDYWLD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1231	SEQ ID NO: 1232	SEQ ID NO: 1233	SEQ ID NO: 1234	SEQ ID NO: 1235	SEQ ID NO: 1236
Ab129	SSYSMH	WVSSISSSAGTSG	ARVPYDYWLD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1237	SEQ ID NO: 1238	SEQ ID NO: 1239	SEQ ID NO: 1240	SEQ ID NO: 1241	SEQ ID NO: 1242
Ab50	SSYSMH	WVAAIKSNGGYIY	ARVPYDYWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1243	SEQ ID NO: 1244	SEQ ID NO: 1245	SEQ ID NO: 1246	SEQ ID NO: 1247	SEQ ID NO: 1248
Ab90	SSYAMH	WVAAISSNTGYIY	ARVPYDYWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1249	SEQ ID NO: 1250	SEQ ID NO: 1251	SEQ ID NO: 1252	SEQ ID NO: 1253	SEQ ID NO: 1254
Ab99	SSYSMS	WVAAISSSASTTS	ARVPYDYWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1255	SEQ ID NO: 1256	SEQ ID NO: 1257	SEQ ID NO: 1258	SEQ ID NO: 1259	SEQ ID NO: 1260
Ab3	SDYGMH	WVAGIWYNGGYKS	ARVPYDYWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1261	SEQ ID NO: 1262	SEQ ID NO: 1263	SEQ ID NO: 1264	SEQ ID NO: 1265	SEQ ID NO: 1266
Ab148	SSYSMS	WVASIKGSAGYIY	ARVPYDYWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1267	SEQ ID NO: 1268	SEQ ID NO: 1269	SEQ ID NO: 1270	SEQ ID NO: 1271	SEQ ID NO: 1272
Ab124	SSYSMH	WVASIKGSASYSY	ARVPYDYWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1273	SEQ ID NO: 1274	SEQ ID NO: 1275	SEQ ID NO: 1276	SEQ ID NO: 1277	SEQ ID NO: 1278
Ab22	SSYSMH	WVASIKSSGGSKY	ARVPYDYWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL

FIG. 3C
(ARV) CDRs

clone	HCDR1	HCDR2	HCDR3	LCDR1	LCDR2	LCDR3
	SEQ ID NO: 1279	SEQ ID NO: 1280	SEQ ID NO: 1281	SEQ ID NO: 1282	SEQ ID NO: 1283	SEQ ID NO: 1284
Ab41	SSYSMH	WVASIKSSGGYIS	ARVPYDYWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1285	SEQ ID NO: 1286	SEQ ID NO: 1287	SEQ ID NO: 1288	SEQ ID NO: 1289	SEQ ID NO: 1290
Ab119	SSYSMS	WVASIKSSTGTIS	ARVPYDYWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1291	SEQ ID NO: 1292	SEQ ID NO: 1293	SEQ ID NO: 1294	SEQ ID NO: 1295	SEQ ID NO: 1296
Ab157	SSYSMN	WVASINSNAGSTY	ARVPYDYWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1297	SEQ ID NO: 1298	SEQ ID NO: 1299	SEQ ID NO: 1300	SEQ ID NO: 1301	SEQ ID NO: 1302
Ab27	SSYSMX	WVASISSSGGSIY	ARVPYDYWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1303	SEQ ID NO: 1304	SEQ ID NO: 1305	SEQ ID NO: 1306	SEQ ID NO: 1307	SEQ ID NO: 1308
Ab15	SSYSMH	WVASIWSNSGNTG	ARVPYDYWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1309	SEQ ID NO: 1310	SEQ ID NO: 1311	SEQ ID NO: 1312	SEQ ID NO: 1313	SEQ ID NO: 1314
Ab191	SSYSMH	WVSSIKSSASYSS	ARVPYDYWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1315	SEQ ID NO: 1316	SEQ ID NO: 1317	SEQ ID NO: 1318	SEQ ID NO: 1319	SEQ ID NO: 1320
Ab190	SSYAMH	WVAAIKSSAGYSY	ARVPYGVWID	SYYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1321	SEQ ID NO: 1322	SEQ ID NO: 1323	SEQ ID NO: 1324	SEQ ID NO: 1325	SEQ ID NO: 1326
Ab79	SSYAMH	WVADIKSNTGYTY	ARVPYGVWID	SYYANWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1327	SEQ ID NO: 1328	SEQ ID NO: 1329	SEQ ID NO: 1330	SEQ ID NO: 1331	SEQ ID NO: 1332
Ab181	SSYAMS	WVASIKSSTGYTY	ARVPYGVWID	SYYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1333	SEQ ID NO: 1334	SEQ ID NO: 1335	SEQ ID NO: 1336	SEQ ID NO: 1337	SEQ ID NO: 1338
Ab146	SSYAMH	WVASISGNAGSSS	ARVPYGVWID	SYYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1339	SEQ ID NO: 1340	SEQ ID NO: 1341	SEQ ID NO: 1342	SEQ ID NO: 1343	SEQ ID NO: 1344
Ab167	SSYAMH	WVASISGNAGSSS	ARVPYGVWID	SYYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1345	SEQ ID NO: 1346	SEQ ID NO: 1347	SEQ ID NO: 1348	SEQ ID NO: 1349	SEQ ID NO: 1350
Ab88	SSYSMS	WVASISSSAGTTS	ARVPYGVWID	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1351	SEQ ID NO: 1352	SEQ ID NO: 1353	SEQ ID NO: 1354	SEQ ID NO: 1355	SEQ ID NO: 1356
Ab199	SSYSMH	WVASISSSASTSG	ARVPYGVWID	SYYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1357	SEQ ID NO: 1358	SEQ ID NO: 1359	SEQ ID NO: 1360	SEQ ID NO: 1361	SEQ ID NO: 1362
Ab71	SSYSMH	WVASISSSASTSY	ARVPYGVWID	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1363	SEQ ID NO: 1364	SEQ ID NO: 1365	SEQ ID NO: 1366	SEQ ID NO: 1367	SEQ ID NO: 1368
Ab85	SSYAMS	WVSAISGSGGSTY	ARVPYGVWID	SYYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1369	SEQ ID NO: 1370	SEQ ID NO: 1371	SEQ ID NO: 1372	SEQ ID NO: 1373	SEQ ID NO: 1374
Ab59	SSYAMN	WVAAISGNAGSSS	ARVPYGVWLD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1375	SEQ ID NO: 1376	SEQ ID NO: 1377	SEQ ID NO: 1378	SEQ ID NO: 1379	SEQ ID NO: 1380
Ab141	SSYAMS	WVSAISGSGGSTY	ARVPYGVWLD	SYYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1381	SEQ ID NO: 1382	SEQ ID NO: 1383	SEQ ID NO: 1384	SEQ ID NO: 1385	SEQ ID NO: 1386
Ab68	SSYSMH	WVAAIKGNTGSTY	ARVPYGVWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL

FIG. 3C
(ARV) CDRs

clone	HCDR1	HCDR2	HCDR3	LCDR1	LCDR2	LCDR3
	SEQ ID NO: 1387	SEQ ID NO: 1388	SEQ ID NO: 1389	SEQ ID NO: 1390	SEQ ID NO: 1391	SEQ ID NO: 1392
Ab143	SSYSMH	WVAAINSNAGSSS	ARVPYGVWMD	SYYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1393	SEQ ID NO: 1394	SEQ ID NO: 1395	SEQ ID NO: 1396	SEQ ID NO: 1397	SEQ ID NO: 1398
Ab46	SSYSMH	WVAGIWSSGGTTS	ARVPYGVWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1399	SEQ ID NO: 1400	SEQ ID NO: 1401	SEQ ID NO: 1402	SEQ ID NO: 1403	SEQ ID NO: 1404
Ab197	SSYSMH	WVAYIKGSAGSTS	ARVPYGVWMD	SYYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1405	SEQ ID NO: 1406	SEQ ID NO: 1407	SEQ ID NO: 1408	SEQ ID NO: 1409	SEQ ID NO: 1410
Ab175	SSYSMH	WVSAINSNAGSSS	ARVPYGVWMD	SYYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1411	SEQ ID NO: 1412	SEQ ID NO: 1413	SEQ ID NO: 1414	SEQ ID NO: 1415	SEQ ID NO: 1416
Ab156	SSYAMS	WVSYISGNAGYIS	ARVPYGVWMD	SSYAAWY	LLIYGNTSRQ	QQYSNSPL
	SEQ ID NO: 1417	SEQ ID NO: 1418	SEQ ID NO: 1419	SEQ ID NO: 1420	SEQ ID NO: 1421	SEQ ID NO: 1422
Ab63	SSYSMH	WVASISGSTGTSY	ARVPYGYWID	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1423	SEQ ID NO: 1424	SEQ ID NO: 1425	SEQ ID NO: 1426	SEQ ID NO: 1427	SEQ ID NO: 1428
Ab11	SSYGMH	WVASISSNGGYTS	ARVPYGYWID	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1429	SEQ ID NO: 1430	SEQ ID NO: 1431	SEQ ID NO: 1432	SEQ ID NO: 1433	SEQ ID NO: 1434
Ab182	SSYSMH	WVASISSNTGTTG	ARVPYGYWID	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1435	SEQ ID NO: 1436	SEQ ID NO: 1437	SEQ ID NO: 1438	SEQ ID NO: 1439	SEQ ID NO: 1440
Ab89	SSYAMH	WVTSISSSTGYIS	ARVPYGYWID	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1441	SEQ ID NO: 1442	SEQ ID NO: 1443	SEQ ID NO: 1444	SEQ ID NO: 1445	SEQ ID NO: 1446
Ab8	SSYAMS	WVADIKSNGGYTY	ARVPYGYWLD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1447	SEQ ID NO: 1448	SEQ ID NO: 1449	SEQ ID NO: 1450	SEQ ID NO: 1451	SEQ ID NO: 1452
Ab101	SSYAMS	WVADISGSAGTIS	ARVPYGYWLD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1453	SEQ ID NO: 1454	SEQ ID NO: 1455	SEQ ID NO: 1456	SEQ ID NO: 1457	SEQ ID NO: 1458
Ab25	SSYGMH	WVAAIKSSGSSTS	ARVPYGYWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1459	SEQ ID NO: 1460	SEQ ID NO: 1461	SEQ ID NO: 1462	SEQ ID NO: 1463	SEQ ID NO: 1464
Ab154	SSYSMH	WVASIKSNTGTTG	ARVPYGYWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1465	SEQ ID NO: 1466	SEQ ID NO: 1467	SEQ ID NO: 1468	SEQ ID NO: 1469	SEQ ID NO: 1470
Ab21	SSYAMS	WVSAISGSGGSTY	ARVPYGYWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1471	SEQ ID NO: 1472	SEQ ID NO: 1473	SEQ ID NO: 1474	SEQ ID NO: 1475	SEQ ID NO: 1476
Ab111	SSYSMH	WVSAISGSGGSTY	ARVPYGYWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1477	SEQ ID NO: 1478	SEQ ID NO: 1479	SEQ ID NO: 1480	SEQ ID NO: 1481	SEQ ID NO: 1482
Ab118	SSYAMS	WVSSINSNAGTSY	ARVPYGYWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1483	SEQ ID NO: 1484	SEQ ID NO: 1485	SEQ ID NO: 1486	SEQ ID NO: 1487	SEQ ID NO: 1488
Ab173	SSYAMS	WVSSISSNTGTIS	ARVPYGYWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1489	SEQ ID NO: 1490	SEQ ID NO: 1491	SEQ ID NO: 1492	SEQ ID NO: 1493	SEQ ID NO: 1494
Ab38	SSYTMS	WVAGIWSDSGNKG	ARVPYSVWID	SSYLNWY	LLIYAASSLQ	QQSYSTPL

FIG. 3C
(ARV) CDRs

clone	HCDR1	HCDR2	HCDR3	LCDR1	LCDR2	LCDR3
	SEQ ID NO: 1495	SEQ ID NO: 1496	SEQ ID NO: 1497	SEQ ID NO: 1498	SEQ ID NO: 1499	SEQ ID NO: 1500
Ab76	DSYSMH	WVSAISGSGGSTY	ARVPYSVWID	SYYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1501	SEQ ID NO: 1502	SEQ ID NO: 1503	SEQ ID NO: 1504	SEQ ID NO: 1505	SEQ ID NO: 1506
Ab131	SSYAMS	WVSDIKSSAGSTS	ARVPYSVWID	SYYVNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1507	SEQ ID NO: 1508	SEQ ID NO: 1509	SEQ ID NO: 1510	SEQ ID NO: 1511	SEQ ID NO: 1512
Ab1	SSYAMH	WVSGISSNGGSTS	ARVPYSVWID	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1513	SEQ ID NO: 1514	SEQ ID NO: 1515	SEQ ID NO: 1516	SEQ ID NO: 1517	SEQ ID NO: 1518
	SSYAMH	WVSGISSNGGSTS	ARAPYSVWID	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1519	SEQ ID NO: 1520	SEQ ID NO: 1521	SEQ ID NO: 1522	SEQ ID NO: 1523	SEQ ID NO: 1524
	SSYAMH SEQ ID NO: 1593	WVSGISSNGGSTS SEQ ID NO: 1594	ARVPYSVWAD SEQ ID NO: 1595	SSYLNWY SEQ ID NO: 1596	LLIYAASSLQ SEQ ID NO: 1597	QQSYSTPL SEQ ID NO: 1598
Ab67	SSYAMS	WVASIKSSTGTTY	ARVPYSVWLD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1525	SEQ ID NO: 1526	SEQ ID NO: 1527	SEQ ID NO: 1528	SEQ ID NO: 1529	SEQ ID NO: 1530
Ab70	SSYAMN	WVASISSNTGTIG	ARVPYSVWLD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1531	SEQ ID NO: 1532	SEQ ID NO: 1533	SEQ ID NO: 1534	SEQ ID NO: 1535	SEQ ID NO: 1536
Ab170	NSYAMH	WVAYISGNAGSIY	ARVPYSVWLD	SYYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1537	SEQ ID NO: 1538	SEQ ID NO: 1539	SEQ ID NO: 1540	SEQ ID NO: 1541	SEQ ID NO: 1542
Ab30	SSYGMH	WVASIKSNSGNTG	ARVPYSVWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1543	SEQ ID NO: 1544	SEQ ID NO: 1545	SEQ ID NO: 1546	SEQ ID NO: 1547	SEQ ID NO: 1548
Ab93	SSYAMS	WVASISSSTGTIS	ARVPYSVWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1549	SEQ ID NO: 1550	SEQ ID NO: 1551	SEQ ID NO: 1552	SEQ ID NO: 1553	SEQ ID NO: 1554
Ab142	SSYSMH	WVSAISGSGGSTY	ARVPYSVWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1555	SEQ ID NO: 1556	SEQ ID NO: 1557	SEQ ID NO: 1558	SEQ ID NO: 1559	SEQ ID NO: 1560
Ab104	SSYAMS	WVSSISSSASYTG	ARVPYSYWID	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1561	SEQ ID NO: 1562	SEQ ID NO: 1563	SEQ ID NO: 1564	SEQ ID NO: 1565	SEQ ID NO: 1566
Ab112	SSYAMS	WVASISSNTGSIY	ARVPYSYWLD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1567	SEQ ID NO: 1568	SEQ ID NO: 1569	SEQ ID NO: 1570	SEQ ID NO: 1571	SEQ ID NO: 1572
Ab35	SSYGMH	WVASISSSSGYKY	ARVPYSYWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1573	SEQ ID NO: 1574	SEQ ID NO: 1575	SEQ ID NO: 1576	SEQ ID NO: 1577	SEQ ID NO: 1578
Ab126	SSYAMH	WVASISSSTGSIG	ARVPYSYWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1579	SEQ ID NO: 1580	SEQ ID NO: 1581	SEQ ID NO: 1582	SEQ ID NO: 1583	SEQ ID NO: 1584
Ab125	SSYSMH	WVASIKGNAGTTY	AKVPYDVWMD	SSYLNWY	LLIYAASSLQ	QQSYSTPL
	SEQ ID NO: 1585	SEQ ID NO: 1586	SEQ ID NO: 1587	SEQ ID NO: 1588	SEQ ID NO: 1589	SEQ ID NO: 1590

FIG. 4

T-cell immunoreceptor with Ig and ITIM domains precursor [Homo sapiens]
MRWCLLLIWAQGLRQAPLASGMMTGTIETTGNISAEKGGSIILQCHLSSTTAQVTQVNWEQQDQLLAICN
ADLGWHISPSFKDRVAPGPGLGLTLQSLTVNDTGEYFCIYHTYPDGTYTGRIFLEVLESSVAEHGARFQI
PLLGAMAATLVVICTAVIVVVALTRKKKALRIHSVEGDLRRKSAGQEEWSPSAPSPPGSCVQAEAAPAGL
CGEQRGEDCAELHDYFNVLSYRSLGNCSFFTETG (SEQ ID NO: 1591)

T-cell immunoreceptor with Ig and ITIM domains precursor [Mus musculus]
MHGWLLLVWVQGLIQAAFLATGATAGTIDTKRNISAEEGGSVILQCHFSSDTAEVTQVDWKQQDQLLAIY
SVDLGWHVASVFSDRVVPGPSLGLTFQSLTMNDTGEYFCTYHTYPGGIYKGRIFLKVQESSVAQFQTAPL
GGTMAAVLGLICLMVTGVTVLARKKSIRMHSIESGLGRTEAEPQEWNLRSLSSPGSPVQTQTAPAGPCGE
QAEDDYADPQEYFNVLSYRSLESFIAVSKTG (SEQ ID NO: 1592)

FIG. 5

$Z_1Z_2Z_3Z_4Z_5Z_6Z_7Z_8Z_9Z_{10}$ (SEQ ID NO: 1599)

$SSYX_4MX_6$ (SEQ ID NO: 1600)

$WVY_3Y_4IY_6Y_7Y_8Y_9Y_{10}Y_{11}Y_{12}Y_{13}$ (SEQ ID NO: 1601)

$ARZ_3PYZ_6Z_7WZ_9D$ (SEQ ID NO: 1602)

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2017/064307

A. CLASSIFICATION OF SUBJECT MATTER
INV. C07K16/28
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
C07K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, BIOSIS, EMBASE, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2016/191643 A2 (ONCOMED PHARM INC [US]) 1 December 2016 (2016-12-01) figures 1,16,19	1-58
X	WO 2015/009856 A2 (GENENTECH INC [US]; HOFFMANN LA ROCHE [CH]) 22 January 2015 (2015-01-22) paragraphs [0047] - [0053], [0436]	1-58
X	WO 2016/106302 A1 (SQUIBB BRISTOL MYERS CO [US]) 30 June 2016 (2016-06-30) examples 1-7	1-58
X	WO 2016/028656 A1 (MERCK SHARP & DOHME [US]; WILLIAMS SYBIL M G [US]; LAFACE DRAKE [US];) 25 February 2016 (2016-02-25) examples 2, 9, 10	1-58

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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
9 March 2018	16/05/2018

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Cilensek, Zoran

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2017/064307

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2016/011264 A1 (GENENTECH INC [US]; HOFFMANN LA ROCHE [CH]) 21 January 2016 (2016-01-21) paragraph [0065]; sequences 13-16	1-58
X	N. STANIETSKY ET AL: "The interaction of TIGIT with PVR and PVRL2 inhibits human NK cell cytotoxicity", PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES, vol. 106, no. 42, 20 October 2009 (2009-10-20), pages 17858-17863, XP055215810, ISSN: 0027-8424, DOI: 10.1073/pnas.0903474106 the whole document	1-58

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2017/064307

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☒ Claims Nos.: 1-58(partially)
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

see FURTHER INFORMATION sheet PCT/ISA/210

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-58(partially)

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-58(partially)

An isolated antigen binding molecule that binds to human TIGIT, wherein the isolated antigen binding molecule comprises at least
(a) (i) a heavy chain variable region comprising the heavy chain of clone Ab117 (SEQ ID NO: 62) and
(ii) a light chain variable region comprising the light chain of clone Ab117 (SEQ ID NO: 159).

2-6. claims: 1-58(partially)

Idem as item 1,
wherein the isolated antigen binding molecule that binds to human TIGIT, wherein the isolated antigen binding molecule comprises at least
(b) (i) a heavy chain variable region comprising the heavy chain of clone Ab53 (SEQ ID NO: 199) and
(ii) a light chain variable region comprising the light chain of clone Ab53 (SEQ ID NO: 214);
(c) (i) a heavy chain variable region comprising the heavy chain of clone Ab40 (SEQ ID NO: 200) and
(ii) a light chain variable region comprising the light chain of clone Ab40 (SEQ ID NO: 215);
(d) (i) a heavy chain variable region comprising the heavy chain of clone Ab48 (SEQ ID NO: 203) and
(ii) a light chain variable region comprising the light chain of clone Ab48 (SEQ ID NO: 218);
(e) (i) a heavy chain variable region comprising the heavy chain of clone Ab1 (SEQ ID NO: 299) and
(ii) a light chain variable region comprising the light chain of clone Ab1 (SEQ ID NO: 385); or
(f) (i) a heavy chain variable region comprising the heavy chain of clone Ab143 (SEQ ID NO: 279) and
(ii) a light chain variable region comprising the light chain of clone Ab143 (SEQ ID NO: 365), respectively.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box II.2

Claims Nos.: 1-58(partially)

The present application comprises 58 claims, spanning over 36 pages and relating to several million possible antibodies (Markush formulae). This is further exacerbated by the fact that there are multiple independent product claims (claims 1, 4-11, 21-24 and 58).

According to Rule 6.1(a) PCT, the number of claims shall be reasonable in consideration of the nature of the invention claimed, which is not the case here. The examiner is unable to search the millions of combinations claimed without undue burden.

Furthermore, the application relates to sequence combinations which may or may not generate an antibody with defined technical properties.

In view of the importance of the role played by each single amino acid in the binding of an antibody to its target, especially at the level of its CDRs (see Rudikoff et.al., PNAS 1982, Vol.79, pp. 1979-1983), a claim to an antibody which is structurally characterised by less than the full sequence of all the CDRs, and their specific order, cannot be seen to sufficiently disclose an antibody with any particular properties. Thus, it is apparent that a search of all possible combinations of claimed sequences would not be useful, since only an antibody defined by at least 6 CDRs (HCDR1-3, LCDR1-3) has any defined technical properties of binding.

The same holds true for antibodies competing such with such antibodies. Such claims, like claim 1, are thus in fact directed to any anti TIGIT antibody.

It would appear that only independent claim 58 defines six anti TIGIT antibodies in terms of structural features, i.e. by reference to respective heavy and light chain variable regions. The examiner would be able to search said subject-matter.

No response to the request for informal clarification has been received from Applicant.

The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guidelines C-IV, 7.2), should the problems which led to the Article 17(2) declaration be overcome.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/US2017/064307

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2016191643 A2	01-12-2016	AU 2016267577 A1	21-12-2017
		CA 2987607 A1	01-12-2016
		EP 3303379 A2	11-04-2018
		KR 20180014050 A	07-02-2018
		TW 201718646 A	01-06-2017
		US 2016376365 A1	29-12-2016
		WO 2016191643 A2	01-12-2016
WO 2015009856 A2	22-01-2015	AU 2014290069 A1	11-02-2016
		CA 2916681 A1	22-01-2015
		CN 105492025 A	13-04-2016
		EP 3021869 A2	25-05-2016
		HK 1217283 A1	06-01-2017
		JP 2016525117 A	22-08-2016
		KR 20160030936 A	21-03-2016
		RU 2016104880 A	21-08-2017
		SG 11201600310Q A	26-02-2016
		TW 201545757 A	16-12-2015
		US 2015216970 A1	06-08-2015
		US 2017037127 A1	09-02-2017
		US 2017044256 A1	16-02-2017
		WO 2015009856 A2	22-01-2015
WO 2016106302 A1	30-06-2016	AR 103268 A1	26-04-2017
		AU 2015369683 A1	10-08-2017
		CA 2971732 A1	30-06-2016
		CN 107207594 A	26-09-2017
		EA 201791171 A1	30-11-2017
		EP 3237448 A1	01-11-2017
		JP 6180663 B2	16-08-2017
		JP 2017520512 A	27-07-2017
		JP 2018035138 A	08-03-2018
		KR 20170099966 A	01-09-2017
		PE 12442017 A1	24-08-2017
		PH 12017501166 A1	11-12-2017
		SG 11201705063V A	28-07-2017
		TW 201629102 A	16-08-2016
		US 2016176963 A1	23-06-2016
		UY 36471 A	30-06-2016
		WO 2016106302 A1	30-06-2016
WO 2016028656 A1	25-02-2016	AU 2015305754 A1	23-02-2017
		CA 2957722 A1	25-02-2016
		CL 2017000310 A1	18-08-2017
		CN 107148430 A	08-09-2017
		CR 20170060 A	18-04-2017
		DO P2017000046 A	31-08-2017
		EP 3183267 A1	28-06-2017
		JP 2017532007 A	02-11-2017
		KR 20170041272 A	14-04-2017
		MD 20170032 A2	31-08-2017
		PE 02892017 A1	05-04-2017
		PH 12017500296 A1	28-06-2017
		SG 11201701161Q A	30-03-2017
		TW 201609813 A	16-03-2016
		US 2016355589 A1	08-12-2016
		US 2017198042 A1	13-07-2017
		US 2018066055 A1	08-03-2018

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/US2017/064307

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		WO 2016028656 A1	25-02-2016
WO 2016011264 A1	21-01-2016	AU 2015289621 A1	12-01-2017
		CA 2953245 A1	21-01-2016
		CL 2017000080 A1	23-06-2017
		CN 107073108 A	18-08-2017
		CR 20170014 A	17-10-2017
		EA 201790195 A1	29-09-2017
		EP 3169363 A1	24-05-2017
		JP 2017522311 A	10-08-2017
		KR 20170023081 A	02-03-2017
		PE 01402017 A1	30-03-2017
		PH 12017500070 A1	15-05-2017
		SG 11201700258V A	27-02-2017
		US 2017143825 A1	25-05-2017
		WO 2016011264 A1	21-01-2016