CLAIMS

What is claimed is:

~~1. A multi-specific antigen binding molecule that binds to human CD3 and an HIV antigen, wherein the antigen binding molecule comprises:~~

~~(a) a first antigen binding domain that comprises a first heavy chain variable domain (VH) and a first light chain variable domain (VL), wherein the first antigen binding domain binds to CD3 and comprises:~~

~~(i) a first VH complementarity determining region (CDR) 1 comprising the amino acid sequence of TYAMN (SEQ ID NO:1);~~

~~(ii) a first VH-CDR2 comprising the amino acid sequence of RIRSKYNNYATYYAX$_1$SVKX$_2$, wherein X$_1$ is A or D and X$_2$ is G or S (SEQ ID NO:2);~~

~~(iii) a first VH-CDR3 comprising the amino acid sequence of HGNFGX$_3$SYVSWFAY, wherein X$_3$ is H or N (SEQ ID NO:3);~~

~~(iv) a first VL-CDR1 comprising the amino acid sequence of GSSTGAVTTGHYAN (SEQ ID NO: 4);~~

~~(v) a first VL-CDR2 comprising the amino acid sequence of GTX$_4$X$_5$RAP, wherein X$_4$X$_5$ is SN or NK (SEQ ID NO:5); and~~

~~(vi) a first VL-CDR3 comprising the amino acid sequence of ALWYSNX$_6$WV, wherein X$_6$ is L or R (SEQ ID NO:6), wherein the first VH-CDR1, the first VH-CDR2, the first VH-CDR3, the first VL-CDR1, the first VL-CDR2, and the first VH-CDR3 are according to Kabat; and~~

~~(b) a second antigen binding domain that binds to an HIV antigen.~~

~~2. A multi-specific antigen binding molecule that binds to human CD3 and a second antigen, wherein the antigen binding molecule comprises:~~

~~(a) a first antigen binding domain that comprises a first heavy chain variable domain (VH) and a first light chain variable domain (VL), wherein the first antigen binding domain binds to CD3 and comprises:~~

~~(i) a first VH complementarity determining region (CDR) 1 comprising the amino acid sequence of TYAMN (SEQ ID NO:1);~~

~~(ii) a first VH-CDR2 comprising the amino acid sequence of RIRSKYNNYATYYAX$_1$SVKX$_2$, wherein X$_1$ is A or D and X$_2$ is G or S (SEQ ID NO:2);~~

~~(iii) a first VH-CDR3 comprising the amino acid sequence of HGNFGX$_3$SYVSWFAY, wherein X$_3$ is H or N (SEQ ID NO:3);~~

(iv) a first VL-CDR1 comprising the amino acid sequence of GSSTGAVTTGHYAN (SEQ ID NO: 4);

(v) a first VL-CDR2 comprising the amino acid sequence of GTX_4X_5RAP, wherein X_4X_5 is SN or NK (SEQ ID NO:5); and

(vi) a first VL-CDR3 comprising the amino acid sequence of $ALWYSNX_6WV$, wherein X_6 is L or R (SEQ ID NO:6), wherein the first VH-CDR1, the first VH-CDR2, the first VH-CDR3, the first VL-CDR1, the first VL-CDR2, and the first VH-CDR3 are according to Kabat; and

(b) a second antigen binding domain that binds to a second antigen.

3. The multi-specific antigen binding molecule of any one of claims 1 to 2, wherein:

(i) the first VH complementarity determining region (CDR) 1 comprises the amino acid sequence of TYAMN (SEQ ID NO:1);

(ii) the first VH-CDR2 comprises the amino acid sequence of $RIRSKYNNYATYYADSVKX_2$, wherein X_2 is G or S (SEQ ID NO:7);

(iii) the first VH-CDR3 comprises the amino acid sequence of HGNFGHSYVSWFAY (SEQ ID NO:8);

(iv) the first VL-CDR1 comprises the amino acid sequence of GSSTGAVTTGHYAN (SEQ ID NO: 4);

(v) the first VL-CDR2 comprises the amino acid sequence of GTSNRAP (SEQ ID NO:9); and

(vi) the first VL-CDR3 comprises the amino acid sequence of ALWYSNRWV (SEQ ID NO:10).

4. The multi-specific antigen binding molecule of any one of claims 1 to 3, wherein the first VH-CDR1, the first VH-CDR2, the first VH-CDR3, the first VL-CDR1, the first VL-CDR2 and the first VL-CDR3 comprise the following amino acid sequences, respectively:

(i) SEQ ID NOs: 1, 11, 8, 4, 5 and 10;

(ii) SEQ ID NOs: 1, 11, 8, 4, 9 and 10;

(iii) SEQ ID NOs: 1, 12, 8, 4, 9 and 10;

(iv) SEQ ID NOs: 1, 13, 8, 4, 14 and 15;

(v) SEQ ID NOs: 1, 13, 16, 4, 14 and 15; or

(vi) SEQ ID NOs: 1, 11, 8, 4, 14 and 10.

~~5. The multi-specific antigen binding molecule of any one of claims 1 to 4, wherein the first VH-CDR1, the first VH-CDR2, the first VH-CDR3, the first VL-CDR1, the first VL-CDR2 and the first VL-CDR3 comprise the following amino acid sequences, respectively:~~

~~(i) SEQ ID NOs: 1, 11, 8, 4, 9 and 10; or~~

~~(ii) SEQ ID NOs: 1, 12, 8, 4, 9 and 10.~~

~~6. The multi-specific antigen binding molecule of any one of claims 1 to 5, wherein the first VH-CDR1, the first VH-CDR2, the first VH-CDR3, the first VL-CDR1, the first VL-CDR2 and the first VL-CDR3 comprise the following amino acid sequences, respectively: SEQ ID NOs: 1, 11, 8, 4, 9 and 10.~~

~~7. The multi-specific antigen binding molecule of any one of claims 1 to 5, wherein the first VH-CDR1, the first VH-CDR2, the first VH-CDR3, the first VL-CDR1, the first VL-CDR2 and the first VL-CDR3 comprise the following amino acid sequences, respectively: SEQ ID NOs: 1, 12, 8, 4, 9 and 10.~~

~~8. A multi-specific antigen binding molecule that binds to human CD3 and an HIV antigen, wherein the antigen binding molecule comprises:~~

~~(a) a first antigen binding domain that comprises a first heavy chain variable domain (VH) and a first light chain variable domain (VL), wherein the first antigen binding domain binds to CD3 and comprises:~~

~~(i) a first VH-CDR1 comprising the amino acid sequence of GFTFNTY (SEQ ID NO:17);~~

~~(ii) a first VH-CDR2 comprising the amino acid sequence of SKYNNY (SEQ ID NO:18);~~

~~(iii) a first VH-CDR3 comprising the amino acid sequence of GNFGX_3SYVSWFA, wherein X_3 is H or N (SEQ ID NO:19);~~

~~(iv) a first VL-CDR1 comprising the amino acid sequence of SSTGAVTTGHY (SEQ ID NO: 20);~~

~~(v) a first VL-CDR2 comprising the amino acid sequence of GTX_4, wherein X_4 is N or S (SEQ ID NO:21); and~~

~~(vi) a first VL-CDR3 comprising the amino acid sequence of WYSNX_6W, wherein X_6 is L or R (SEQ ID NO:22), wherein the first VH-CDR1, the first VH-CDR2, the first VH-CDR3, the first VL-CDR1, the first VL-CDR2, and the first VH-CDR3 are according to Chothia; and~~

(b) a second antigen binding domain that binds to an HIV antigen.

9. A multi-specific antigen binding molecule that binds to human CD3 and a second antigen, wherein the antigen binding molecule comprises:

(a) a first antigen binding domain that comprises a first heavy chain variable domain (VH) and a first light chain variable domain (VL), wherein the first antigen binding domain binds to CD3 and comprises:

(i) a first VH-CDR1 comprising the amino acid sequence of GFTFNTY (SEQ ID NO:17);

(ii) a first VH-CDR2 comprising the amino acid sequence of SKYNNY (SEQ ID NO:18);

(iii) a first VH-CDR3 comprising the amino acid sequence of $GNFGX_3SYVSWFA$, wherein X_3 is H or N (SEQ ID NO:19);

(iv) a first VL-CDR1 comprising the amino acid sequence of SSTGAVTTGHY (SEQ ID NO: 20);

(v) a first VL-CDR2 comprising the amino acid sequence of GTX_4, wherein X_4 is N or S (SEQ ID NO:21); and

(vi) a first VL-CDR3 comprising the amino acid sequence of $WYSNX_6W$, wherein X_6 is L or R (SEQ ID NO:22), wherein the first VH-CDR1, the first VH-CDR2, the first VH-CDR3, the first VL-CDR1, the first VL-CDR2, and the first VH-CDR3 are according to Chothia; and

(b) a second antigen binding domain that binds to a second antigen.

10. The multi-specific antigen binding molecule of any one of claims 8 to 9, wherein the first VH-CDR1, the first VH-CDR2, the first VH-CDR3, the first VL-CDR1, the first VL-CDR2 and the first VL-CDR3 comprise the following amino acid sequences, respectively:

(i) SEQ ID NOs: 17, 18, 23, 20, 21 and 25;

(ii) SEQ ID NOs: 17, 18, 23, 20, 24 and 25;

(iii) SEQ ID NOs: 17, 18, 23, 20, 26 and 27;

(iv) SEQ ID NOs: 17, 18, 75, 20, 26 and 27; or

(v) SEQ ID NOs: 17, 18, 23, 20, 26 and 25.

11. The multi-specific antigen binding molecule of any one of claims 8 to 10, wherein the first VH-CDR1, the first VH-CDR2, the first VH-CDR3, the first VL-

~~CDR1, the first VL-CDR2 and the first VL-CDR3 comprise the following amino acid sequences, respectively: SEQ ID NOs: 17, 18, 23, 20, 24 and 25.~~

~~12. A multi-specific antigen binding molecule that binds to human CD3 and an HIV antigen, wherein the antigen binding molecule comprises:~~

~~(a) a first antigen binding domain that comprises a first heavy chain variable domain (VH) and a first light chain variable domain (VL), wherein the first antigen binding domain binds to CD3 and comprises:~~

~~(i) a first VH-CDR1 comprising the amino acid sequence of GFTFNTYA (SEQ ID NO:28);~~

~~(ii) a first VH-CDR2 comprising the amino acid sequence of IRSKYNNYAT (SEQ ID NO:29);~~

~~(iii) a first VH-CDR3 comprising the amino acid sequence of VRHGNFGX3SYVSWFAY, wherein X3 is H or N (SEQ ID NO:30);~~

~~(iv) a first VL-CDR1 comprising the amino acid sequence of TGAVTTGHY (SEQ ID NO:31);~~

~~(v) a first VL-CDR2 comprising the amino acid sequence of GTX_4, wherein X_4 is N or S (SEQ ID NO:21); and~~

~~(vi) a first VL-CDR3 comprising the amino acid sequence of ALWYSNX6WV, wherein X_6 is L or R (SEQ ID NO:6), wherein the first VH-CDR1, the first VH-CDR2, the first VH-CDR3, the first VL-CDR1, the first VL-CDR2, and the first VH-CDR3 are according to IMGT; and~~

~~(b) a second antigen binding domain that binds to an HIV antigen.~~

~~13. A multi-specific antigen binding molecule that binds to human CD3 and a second antigen, wherein the antigen binding molecule comprises:~~

~~(a) a first antigen binding domain that comprises a first heavy chain variable domain (VH) and a first light chain variable domain (VL), wherein the first antigen binding domain binds to CD3 and comprises:~~

~~(i) a first VH-CDR1 comprising the amino acid sequence of GFTFNTYA (SEQ ID NO:28);~~

~~(ii) a first VH-CDR2 comprising the amino acid sequence of IRSKYNNYAT (SEQ ID NO:29);~~

~~(iii) a first VH-CDR3 comprising the amino acid sequence of VRHGNFGX3SYVSWFAY, wherein X3 is H or N (SEQ ID NO:30);~~

(iv) a first VL-CDR1 comprising the amino acid sequence of TGAVTTGHY (SEQ ID NO:31);

(v) a first VL-CDR2 comprising the amino acid sequence of GTX_4, wherein X_4 is N or S (SEQ ID NO:21); and

(vi) a first VL-CDR3 comprising the amino acid sequence of ALWYSNX6WV, wherein X_6 is L or R (SEQ ID NO:6), wherein the first VH-CDR1, the first VH-CDR2, the first VH-CDR3, the first VL-CDR1, the first VL-CDR2, and the first VH-CDR3 are according to IMGT; and

(b) a second antigen binding domain that binds to a second antigen.

14. The multi-specific antigen binding molecule according to any one of claims 12 to 13, wherein the first VH-CDR1, the first VH-CDR2, the first VH-CDR3, the first VL-CDR1, the first VL-CDR2 and the first VL-CDR3 comprise the following amino acid sequences, respectively:

(i) SEQ ID NOs: 28, 29, 32, 31, 21 and 10;

(ii) SEQ ID NOs: 28, 29, 32, 31, 24 and 10;

(iii) SEQ ID NOs: 28, 29, 32, 31, 26 and 15;

(iv) SEQ ID NOs: 28, 29, 33, 31, 26 and 15; or

(v) SEQ ID NOs: 28, 29, 32, 31, 26 and 10.

15. The multi-specific antigen binding molecule according to any one of claims 12 to 14, wherein the first VH-CDR1, the first VH-CDR2, the first VH-CDR3, the first VL-CDR1, the first VL-CDR2 and the first VL-CDR3 comprise the following amino acid sequences, respectively: SEQ ID NOs: 28, 29, 32, 31, 24 and 10.

16. A multi-specific antigen binding molecule that binds to human CD3 and an HIV antigen, wherein the antigen binding molecule comprises:

(a) a first antigen binding domain that comprises a first heavy chain variable domain (VH) and a first light chain variable domain (VL), wherein the first antigen binding domain binds to CD3 and comprises:

(i) a first VH-CDR1 comprising the amino acid sequence of ASGFTFNTYA (SEQ ID NO:34);

(ii) a first VH-CDR2 comprising the amino acid sequence of $IRSKYNNYATYYAX_1SVKX_2R$, wherein X_1 is A or D and X_2 is G or S (SEQ ID NO:35);

(iii) a first VH-CDR3 comprising the amino acid sequence of $HGNFGX_3SYVSWFA$, X_3 is H or N (SEQ ID NO:36);

(iv) a first VL-CDR1 comprising the amino acid sequence of SSTGAVTTGHY (SEQ ID NO: 37);

(v) a first VL-CDR2 comprising the amino acid sequence of GTX_4NRAPX_7VPAR, wherein X_4 is N or S and X_7 is G or W (SEQ ID NO:38); and

(vi) a first VL-CDR3 comprising the amino acid sequence of $WYSNX_6W$, wherein X_6 is L or R (SEQ ID NO:22), wherein the first VH-CDR1, the first VH-CDR2, the first VH-CDR3, the first VL-CDR1, the first VL-CDR2, and the first VH-CDR3 are according to Honegger; and

(b) a second antigen binding domain that binds to an HIV antigen.

17. A multi-specific antigen binding molecule that binds to human CD3 and a second antigen, wherein the antigen binding molecule comprises:

(a) a first antigen binding domain that comprises a first heavy chain variable domain (VH) and a first light chain variable domain (VL), wherein the first antigen binding domain binds to CD3 and comprises:

(i) a first VH-CDR1 comprising the amino acid sequence of ASGFTFNTYA (SEQ ID NO:34);

(ii) a first VH-CDR2 comprising the amino acid sequence of $IRSKYNNYATYYAX_1SVKX_2R$, wherein X_1 is A or D and X_2 is G or S (SEQ ID NO:35);

(iii) a first VH-CDR3 comprising the amino acid sequence of $HGNFGX_3SYVSWFA$, X_3 is H or N (SEQ ID NO:36);

(iv) a first VL-CDR1 comprising the amino acid sequence of SSTGAVTTGHY (SEQ ID NO: 37);

(v) a first VL-CDR2 comprising the amino acid sequence of GTX_4NRAPX_7VPAR, wherein X_4 is N or S and X_7 is G or W (SEQ ID NO:38); and

(vi) a first VL-CDR3 comprising the amino acid sequence of $WYSNX_6W$, wherein X_6 is L or R (SEQ ID NO:22), wherein the first VH-CDR1, the first VH-CDR2, the first VH-CDR3, the first VL-CDR1, the first VL-CDR2, and the first VH-CDR3 are according to Honegger; and

(b) a second antigen binding domain that binds to a second antigen.

18. The multi-specific antigen binding molecule of any one of claims 16 to 17, wherein:

(i) the first VH-CDR1 comprises the amino acid sequence of ASGFTFNTYA (SEQ ID NO:34);

(ii) the first VH-CDR2 comprises the amino acid sequence of IRSKYNNYATYYADSVKX$_2$R, wherein X$_2$ is G or S (SEQ ID NO:39);

(iii) the first VH-CDR3 comprises the amino acid sequence of HGNFGHSYVSWFA (SEQ ID NO:40);

(iv) the first VL-CDR1 comprises the amino acid sequence of SSTGAVTTGHY (SEQ ID NO: 37);

(v) the first VL-CDR2 comprises the amino acid sequence of GTSNRAPGVPAR (SEQ ID NO:41); and

(vi) the first VL-CDR3 comprises the amino acid sequence of WYSNRW (SEQ ID NO:25).

19. The multi-specific antigen binding molecule of any one of claims 16 to 18, wherein the first VH-CDR1, the first VH-CDR2, the first VH-CDR3, the first VL-CDR1, the first VL-CDR2 and the first VL-CDR3 comprise the following amino acid sequences, respectively:

(i) SEQ ID NOs: 34, 39, 40, 37, 41 and 25;

(ii) SEQ ID NOs: 34, 42, 40, 37, 41 and 25;

(iii) SEQ ID NOs: 34, 43, 40, 37, 41 and 25;

(iv) SEQ ID NOs: 34, 44, 40, 37, 45 and 27;

(v) SEQ ID NOs: 34, 44, 46, 37, 45 and 27; or

(vi) SEQ ID NOs: 34, 42, 40, 37, 47 and 25.

20. The multi-specific antigen binding molecule of any one of claims 16 to 19, wherein the first VH-CDR1, the first VH-CDR2, the first VH-CDR3, the first VL-CDR1, the first VL-CDR2 and the first VL-CDR3 comprise the following amino acid sequences, respectively:

(i) SEQ ID NOs: 34, 42, 40, 37, 41 and 25; or

(ii) SEQ ID NOs: 34, 43, 40, 37, 41 and 25.

21. The multi-specific antigen binding molecule of any one of claims 16 to 20, wherein the first VH-CDR1, the first VH-CDR2, the first VH-CDR3, the first VL-CDR1, the first VL-CDR2 and the first VL-CDR3 comprise the following amino acid sequences, respectively: SEQ ID NOs: 34, 42, 40, 37, 41 and 25.

22. The multi-specific antigen binding molecule of any one of claims 16 to 20, wherein the first VH-CDR1, the first VH-CDR2, the first VH-CDR3, the first VL-

~~CDR1, the first VL-CDR2 and the first VL-CDR3 comprise the following amino acid sequences, respectively: SEQ ID NOs: 34, 43, 40, 37, 41 and 25.~~

~~23. The multi-specific antigen binding molecule of any one of claims 1 to 22, comprising one or more of the following amino acid substitutions (numbering according to Kabat):~~

~~(i) position 81 of the first VH is Q or E;~~

~~(ii) position 83 of the first VH is K or R;~~

~~(iii) position 89 of the first VH is M or V;~~

~~(iv) position 100 of the first VH is H;~~

~~(v) position 57 of the first VL is G or W; and/or~~

~~(vi) position 75 of the first VL is I or L.~~

~~24. The multi-specific antigen binding molecule of claim 23, wherein position 81 of the first VH (numbering according to Kabat) is E.~~

~~25. The multi-specific antigen binding molecule of claim 23, wherein position 81 of the first VH (numbering according to Kabat) is Q.~~

~~26. The multi-specific antigen binding molecule of claim 23, comprising one or more of the following amino acid substitutions (numbering according to Kabat):~~

~~(i) position 81 of the first VH is Q or E;~~

~~(ii) position 83 of the first VH is R;~~

~~(iii) position 89 of the first VH is V;~~

~~(iv) position 100 of the first VH is H;~~

~~(v) position 57 of the first VL is G; and/or~~

~~(vi) position 75 of the first VL is I.~~

~~27. The multi-specific antigen binding molecule of any one of claims 1 to 25, wherein the first VH comprises an amino acid sequence selected from the group consisting of SEQ ID NOs: 48-53, or comprises an amino acid sequence that is at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to an amino acid sequence selected from the group consisting of SEQ ID NOs: 48-53.~~

~~28. The multi-specific antigen binding molecule of any one of claims 1 to 27, wherein the first VH comprises an amino acid sequence that is at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at~~

least 96%, at least 97%, at least 98%, or at least 99% identical to an amino acid sequence of SEQ ID NO: 50.

29. The multi-specific antigen binding molecule of any one of claims 1 to 28, wherein the first VH comprises an amino acid sequence that is at least 95% identical to an amino acid sequence of SEQ ID NO: 50.

30. The multi-specific antigen binding molecule of any one of claims 1 to 29, wherein the first VH comprises an amino acid sequence that is at least 99% identical to an amino acid sequence of SEQ ID NO: 50.

31. The multi-specific antigen binding molecule of any one of claims 1 to 30, wherein the first VH comprises an amino acid sequence of SEQ ID NO: 50.

32. The multi-specific antigen binding molecule of any one of claims 1 to 27, wherein the first VH comprises an amino acid sequence that is at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to an amino acid sequence of SEQ ID NO: 51.

33. The multi-specific antigen binding molecule of any one of claims 1 to 32, wherein the first VH comprises an amino acid sequence that is at least 95% identical to an amino acid sequence of SEQ ID NO: 51.

34. The multi-specific antigen binding molecule of any one of claims 1 to 33, wherein the first VH comprises an amino acid sequence that is at least 99% identical to an amino acid sequence of SEQ ID NO: 51.

35. The multi-specific antigen binding molecule of any one of claims 1 to 34, wherein the first VH comprises an amino acid sequence of SEQ ID NO: 51.

36. The multi-specific antigen binding molecule of claims 1 to 35, wherein the first VL comprises an amino acid sequence selected from the group consisting of SEQ ID NOs: 54-58, or comprises an amino acid sequence that is at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to an amino acid sequence selected from the group consisting of SEQ ID NOs: 54-58.

~~37. The multi-specific antigen binding molecule of claims 1 to 36, wherein the first VL comprises an amino acid sequence that is at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to an amino acid sequence of SEQ ID NO: 56.~~

~~38. The multi-specific antigen binding molecule of claims 1 to 37, wherein the first VL comprises an amino acid sequence that is at least 95% identical to an amino acid sequence of SEQ ID NO: 56.~~

~~39. The multi-specific antigen binding molecule of claims 1 to 38, wherein the first VL comprises an amino acid sequence that is at least 99% identical to an amino acid sequence of SEQ ID NO: 56.~~

~~40. The multi-specific antigen binding molecule of claims 1 to 39, wherein the first VL comprises an amino acid sequence of SEQ ID NO: 56.~~

~~41. The multi-specific antigen binding molecule of any one of claims 1 to 40, wherein the first VH comprises an amino acid sequence selected from the group consisting of SEQ ID NOs: 48-53, or comprises an amino acid sequence that is at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to an amino acid sequence selected from the group consisting of SEQ ID NOs: 48-53 and wherein the first VL comprises an amino acid sequence selected from the group consisting of SEQ ID NOs: 54-58, or comprises an amino acid sequence that is at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to an amino acid sequence selected from the group consisting of SEQ ID NOs: 54-58.~~

~~42. The multi-specific antigen binding molecule of any one of claims 1 to 41, wherein the first VH and the first VL comprise the amino acid sequences set forth, respectively, below, or comprise amino acid sequences that are at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to the amino acid sequences set forth, respectively, below:~~

~~i. SEQ ID NOs: 48 and 54;~~

~~ii. SEQ ID NOs: 49 and 55;~~

iii. SEQ ID NOs: 50 and 55;

iv. SEQ ID NOs: 50 and 56;

v. SEQ ID NOs: 51 and 55;

vi. SEQ ID NOs: 51 and 56;

vii. SEQ ID NOs: 52 and 56;

viii. SEQ ID NOs: 53 and 57; or

ix. SEQ ID NOs: 50 and 58.

43. The multi-specific antigen binding molecule of any one of claims 1 to 42, wherein the first VH and the first VL comprise the amino acid sequences set forth, respectively, below, or comprise amino acid sequences that are at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to the amino acid sequences set forth, respectively, below:

i. SEQ ID NOs: 49 and 55;

ii. SEQ ID NOs: 50 and 55;

iii. SEQ ID NOs: 50 and 56;

iv. SEQ ID NOs: 51 and 55; or

v. SEQ ID NOs: 51 and 56.

44. The multi-specific antigen binding molecule of any one of claims 1 to 43, wherein the first VH and the first VL comprise the amino acid sequences set forth, respectively, below, or comprise amino acid sequences that are at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to the amino acid sequences set forth, respectively: SEQ ID NOs: 50 and 56.

45. The multi-specific antigen binding molecule of any one of claims 1 to 44, wherein the first VH and the first VL comprise amino acid sequences that are at least 95% identical to the amino acid sequences set forth, respectively: SEQ ID NOs: 50 and 56.

46. The multi-specific antigen binding molecule of any one of claims 1 to 45, wherein the first VH and the first VL comprise amino acid sequences that are at least 99% identical to the amino acid sequences set forth, respectively: SEQ ID NOs: 50 and 56.

47. The multi-specific antigen binding molecule of any one of claims 1 to 46, wherein the first VH and the first VL comprise the amino acid sequences set forth, respectively: SEQ ID NOs: 50 and 56.

48. The multi-specific antigen binding molecule of any one of claims 1 to 43, wherein the first VH and the first VL comprise the amino acid sequences set forth, respectively, below, or comprise amino acid sequences that are at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to the amino acid sequences set forth, respectively: SEQ ID NOs: 51 and 56.

49. The multi-specific antigen binding molecule of any one of claims 1 to 48, wherein the first VH and the first VL comprise amino acid sequences that are at least 95% identical to the amino acid sequences set forth, respectively: SEQ ID NOs: 51 and 56.

50. The multi-specific antigen binding molecule of any one of claims 1 to 49, wherein the first VH and the first VL comprise amino acid sequences that are at least 99% identical to the amino acid sequences set forth, respectively: SEQ ID NOs: 51 and 56.

51. The multi-specific antigen binding molecule of any one of claims 1 to 50, wherein the first VH and the first VL comprise the amino acid sequences set forth, respectively: SEQ ID NOs: 51 and 56.

52. The multi-specific antigen binding molecule of any one of claims 23 to 51, wherein the amino acid residue at position 100 of the first VH (numbering according to Kabat) is H.

53. The multi-specific antigen binding molecule of any one of claims 1 to 52, wherein at least one of the first antigen binding domain and the second antigen binding domain independently comprise a Fab, an $F(ab)_2$, Fv, a scFv, a $sc(Fv)_2$, or a diabody.

54. The multi-specific antigen binding molecule of any one of claims 1 to 53, wherein:

i. the first antigen binding domain comprises a scFv and the second antigen binding domain comprises a Fab;

ii. the first antigen binding domain comprises a Fab and the second antigen binding domain comprises a scFv;

iii. the first antigen binding domain comprises a Fab and the second antigen binding domain comprises a Fab; or

iv. the first antigen binding domain comprises a scFv and the second antigen binding domain comprises a scFv.

55. The multi-specific antigen binding molecule of any one of claims 1 to 54, wherein the first antigen binding domain comprises a scFv and the second antigen binding domain comprises a Fab.

56. The multi-specific antigen binding molecule of any one of claims 1 to 53, wherein:

i. the first antigen binding domain comprises a Fab and the second antigen binding domain comprises an extracellular domain of CD4; or

ii. the first antigen binding domain comprises a scFv and the second antigen binding domain comprises an extracellular domain of CD4.

57. The multi-specific antigen binding molecule of any one of claims 1 to 53, wherein the first antigen binding domain comprises a Fab and the second antigen binding domain comprises an extracellular domain of CD4.

58. The multi-specific antigen binding molecule of any one of claims 56 to 57, comprising the following amino acid substitutions (numbering according to Kabat):

i. a cysteine (C) at position 44 in the scFv variable heavy domain; and

ii. a cysteine (C) at position 100 in the scFv variable light domain.

59. The multi-specific antigen binding molecule of any one of claims 1 to 56 and 58, wherein the first antigen binding domain is a scFv comprising a VH and a VL, the scFv comprising an amino acid sequence selected from SEQ ID NOs: 59-66, or comprising an amino acid sequence that is at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to an amino acid sequence selected from SEQ ID NOs: 59-66.

60. The multi-specific antigen binding molecule of any one of claims 1 to 56 and 58 to 59, wherein the first antigen binding domain is a scFv comprising a VH and a VL, the scFv comprising an amino acid sequence selected from SEQ ID NOs: 59-63, or comprising an amino acid sequence that is at least 80%, at least 85%, at least 90%, at least

91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to an amino acid sequence selected from SEQ ID NOs: 59-63.

61. The multi-specific antigen binding molecule of any one of claims 1 to 56 and 58 to 59, wherein the first antigen binding domain is a scFv comprising a VH and a VL, the scFv comprising an amino acid sequence selected from SEQ ID NOs: 62-63, or comprising an amino acid sequence that is at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to an amino acid sequence selected from SEQ ID NOs: 62-63.

62. The multi-specific antigen binding molecule of claim 61, wherein the first antigen binding domain is a scFv comprising a VH and a VL, the scFv comprising an amino acid sequence selected from SEQ ID NO: 62, or comprising an amino acid sequence that is at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to an amino acid sequence of SEQ ID NO: 62.

63. The multi-specific antigen binding molecule of claim 61, wherein the first antigen binding domain is a scFv comprising a VH and a VL, the scFv comprising an amino acid sequence selected from SEQ ID NO: 63, or comprising an amino acid sequence that is at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to an amino acid sequence of SEQ ID NO: 63.

64. The multi-specific antigen binding molecule of any one of claims 1 to 54 and 58 to 61, wherein the second antigen binding domain binds to an HIV envelope protein selected from the group consisting of gp120 and gp41.

65. The multi-specific antigen binding molecule of any one of claims 1 to 64, wherein the second antigen binding domain competes with or comprises VH and VL variable domains of a broadly neutralizing antibody (bNAb) against HIV.

66. The multi-specific antigen binding molecule of any one of claims 1 to 54 and 58 to 65, wherein the second antigen binding domain binds to an epitope or region of gp120 selected from the group consisting of:

i. third variable loop (V3) (*e.g.*, high mannose patch) comprising a N332 oligomannose glycan;

ii. second variable loop (V2) (*e.g.*, Env trimer apex);

iii. CD4 binding site (CD4bs);

iv. gp120/gp41 interface; or

v. silent face of gp120.

67. The multi-specific antigen binding molecule of any one of claims 1 to 54 and 58 to 66, wherein the second antigen binding domain binds to an epitope or region of gp120 in the third variable loop (V3) (*e.g.*, high mannose patch) comprising a N332 oligomannose glycan and competes with or comprises VH and VL regions from an antibody selected from the group consisting of GS-9722 (elipovimab), GS-2872, PGT-121, PGT-121.66, PGT-121.414, PGT-122, PGT-123, PGT-124, PGT-125, PGT-126, PGT-128, PGT-130, PGT-133, PGT-134, PGT-135, PGT-136, PGT-137, PGT-138, PGT-139, 10-1074, 10-1074-J, VRC24, 2G12, BG18, 354BG8, 354BG18, 354BG42, 354BG33, 354BG129, 354BG188, 354BG411, 354BG426, DH270.1, DH270.6, PGDM12, VRC41.01, PGDM21, PCDN-33A, BF520.1 and VRC29.03.

68. The multi-specific antigen binding molecule of any one of claims 1 to 54 and 58 to 66, wherein the second antigen binding domain binds to an epitope or region of gp120 in the second variable loop (V2) (*e.g.*, Env trimer apex) and competes with or comprises VH and VL regions from an antibody selected from the group consisting of PG9, PG16, PGC14, PGG14, PGT-142, PGT-143, PGT-144, PGT-145, CH01, CH59, PGDM1400, CAP256, CAP256-VRC26.08, CAP256-VRC26.09, CAP256-VRC26.25, PCT64-24E and VRC38.01.

69. The multi-specific antigen binding molecule of any one of claims 1 to 54 and 58 to 66, wherein the second antigen binding domain binds to an epitope or region of gp120 in the CD4 binding site (CD4bs) and competes with or comprises VH and VL regions from an antibody selected from the group consisting of 3BNC117, GS-9723, GS-5423, 3BNC60, b12, F105, VRC01, VRC07, VRC07-523, VRC03, VRC06, VRC06b01 VRC08, VRC0801, NIH45-46, PGV04 (*a.k.a.*, VRC-PG04); CH103, 44-VRC13.01, 1NC9, 12A12, N6, 1-18, N49-P7, NC-Cow1, IOMA, CH235 and CH235.12, N49P6, N49P7, N49P11, N49P9 and N60P25.

70. The multi-specific antigen binding molecule of any one of claims 1 to 64 and 66, wherein the second antigen binding domain binds to an epitope or region of

~~gp120 in the CD4 binding site (CD4bs) and comprises one or more extracellular (EC) domains of CD4.~~

~~71. The multi-specific antigen binding molecule of claim 70, wherein the one or more EC domains of CD4 comprise a sequence as set forth below, or a sequence that is at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to a sequence selected from the group consisting of:~~

~~(i) KKVVYGKKGDTVELTCTASQKKNIQFHWKNSNQIKILGNQGSFLTKGPSKLNDRV DSRRSLWDQGNFPLIIKNLKPEDSDTYICEVEDQKEEVQLVVVG (SEQ ID NO: 746);~~

~~(ii) KKVVYGKKGDTVELTCTASQKKNIQFHWKNSNQIKILGNQGSFLTKGPSKLNDRV DSRRSLWDQGNFPLIIKNLKPEDSDTYICEVEDQKEEVQLVVVGGGGSGKKVVYG KKGDTVELTCTASQKKNIQFHWKNSNQIKILGNQGSFLTKGPSKLNDRVDSRRSL WDQGNFPLIIKNLKPEDSDTYICEVEDQKEEVQLVVVG (SEQ ID NO: 747);~~

~~(iii) KKVVLGKKGDTVELTCTASQKKSIQFHWKNSNQIKILGNQGSFLTKGPSKLNDRA DSRRSLWDQGNFPLIIKNLKIEDSDTYICEVEDQKEEVQLLVFG (SEQ ID NO: 748); or~~

~~(iv) KKVVLGKKGDTVELTCTASQKKSIQFHWKNSNQIKILGNQGSFLTKGPSKLNDRA DSRRSLWDQGNFPLIIKNLKIEDSDTYICEVEDQKEEVQLLVFGGGGSGKKVVLG KKGDTVELTCTASQKKSIQFHWKNSNQIKILGNQGSFLTKGPSKLNDRADSRRSL WDQGNFPLIIKNLKIEDSDTYICEVEDQKEEVQLLVFG(SEQ ID NO: 749).~~

~~72. The multi-specific antigen binding molecule of claim 71, wherein the EC domain of CD4 comprises a sequence that is at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to a sequence of SEQ ID NO: 746.~~

~~73. The multi-specific antigen binding molecule of any one of claims 71 to 72, wherein the EC domain of CD4 comprises a sequence that is at least 95% identical to a sequence of SEQ ID NO: 746.~~

~~74. The multi-specific antigen binding molecule of any one of claims 71 to 73, wherein the EC domain of CD4 comprises a sequence that is at least 99% identical to a sequence of SEQ ID NO: 746.~~

~~75. The multi-specific antigen binding molecule of any one of claims 71 to 74, wherein the EC domain of CD4 comprises a sequence of SEQ ID NO: 746.~~

~~76. The multi-specific antigen binding molecule of any one of claims 71 to 75, wherein the first antigen binding domain comprises a first VH-CDR1, a first VH-CDR2, a first VH-CDR3, a first VL-CDR1, a first VL-CDR2 and a first VL-CDR3 comprising the following amino acid sequences, respectively (according to Kabat): SEQ ID NOs: 1, 11, 8, 4, 9 and 10; or SEQ ID NOs: 1, 12, 8, 4, 9 and 10; and the second antigen binding domain comprises one or more EC domains of CD4 comprising an amino acid sequence that comprises or is at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99%, identical to a CD4 EC domain selected from the group consisting of SEQ ID NOs: 746-749.~~

~~77. The multi-specific antigen binding molecule of claim 76, wherein the first antigen binding domain comprises a first VH-CDR1, a first VH-CDR2, a first VH-CDR3, a first VL-CDR1, a first VL-CDR2 and a first VL-CDR3 comprising the following amino acid sequences, respectively (according to Kabat): SEQ ID NOs: 1, 12, 8, 4, 9 and 10; and the second antigen binding domain comprises one or more EC domains of CD4 comprising an amino acid sequence that comprises or is at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99%, identical to a CD4 EC domain selected from the group consisting of SEQ ID NO: 746.~~

~~78. The multi-specific antigen binding molecule of any one of claims 71 to 75, wherein the first antigen binding domain comprises a first VH-CDR1, a first VH-CDR2, a first VH-CDR3, a first VL-CDR1, a first VL-CDR2 and a first VL-CDR3 comprising the following amino acid sequences, respectively (according to Chothia): SEQ ID NOs: 17, 18, 23, 20, 24 and 25; and the second antigen binding domain comprises one or more EC domains of CD4 comprising an amino acid sequence that comprises or is at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99%, identical to a CD4 EC domain selected from the group consisting of SEQ ID NOs: 746-749.~~

~~79. The multi-specific antigen binding molecule of claim 78, wherein the first antigen binding domain comprises a first VH-CDR1, a first VH-CDR2, a first VH-CDR3, a first VL-CDR1, a first VL-CDR2 and a first VL-CDR3 comprising the following~~

amino acid sequences, respectively (according to Chothia): SEQ ID NOs: 17, 18, 23, 20, 24 and 25; and the second antigen binding domain comprises one or more EC domains of CD4 comprising an amino acid sequence that comprises or is at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99%, identical to a CD4 EC domain selected from the group consisting of SEQ ID NO: 746.

80. The multi-specific antigen binding molecule of any one of claims 71 to 75, wherein the first antigen binding domain comprises a first VH-CDR1, a first VH-CDR2, a first VH-CDR3, a first VL-CDR1, a first VL-CDR2 and a first VL-CDR3 comprising the following amino acid sequences, respectively (according to IMGT): SEQ ID NOs: 28, 29, 32, 31, 24 and 10; and the second antigen binding domain comprises one or more EC domains of CD4 comprising an amino acid sequence that comprises or is at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99%, identical to a CD4 EC domain selected from the group consisting of SEQ ID NOs: 746-749.

81. The multi-specific antigen binding molecule of claim 80, wherein the first antigen binding domain comprises a first VH-CDR1, a first VH-CDR2, a first VH-CDR3, a first VL-CDR1, a first VL-CDR2 and a first VL-CDR3 comprising the following amino acid sequences, respectively (according to IMGT): SEQ ID NOs: 28, 29, 32, 31, 24 and 10; and the second antigen binding domain comprises one or more EC domains of CD4 comprising an amino acid sequence that comprises or is at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99%, identical to a CD4 EC domain selected from the group consisting of SEQ ID NO: 746.

82. The multi-specific antigen binding molecule of any one of claims 71 to 75, wherein the first antigen binding domain comprises a first VH-CDR1, a first VH-CDR2, a first VH-CDR3, a first VL-CDR1, a first VL-CDR2 and a first VL-CDR3 comprising the following amino acid sequences, respectively (according to Honegger): SEQ ID NOs: 34, 42, 40, 37, 41 and 25; or SEQ ID NOs: 34, 43, 40, 37, 41 and 25; and the second antigen binding domain comprises one or more EC domains of CD4 comprising an amino acid sequence that comprises or is at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at

least 98%, or at least 99%, identical to a CD4 EC domain selected from the group consisting of SEQ ID NOs: 746-749.

83. The multi-specific antigen binding molecule of claim 82, wherein the first antigen binding domain comprises a first VH-CDR1, a first VH-CDR2, a first VH-CDR3, a first VL-CDR1, a first VL-CDR2 and a first VL-CDR3 comprising the following amino acid sequences, respectively (according to Honegger): SEQ ID NOs: 34, 43, 40, 37, 41 and 25; and the second antigen binding domain comprises one or more EC domains of CD4 comprising an amino acid sequence that comprises or is at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99%, identical to a CD4 EC domain selected from the group consisting of SEQ ID NO: 746.

84. The multi-specific antigen binding molecule of any one of claims 71 to 75, wherein the first antigen binding domain comprises a first VH and a first VL comprising the amino acid sequences set forth, respectively, or comprising amino acid sequences that are at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to the amino acid sequences set forth, respectively: SEQ ID NOs: 49 and 55; SEQ ID NOs: 50 and 55; SEQ ID NOs: 50 and 56; SEQ ID NOs: 51 and 55; or SEQ ID NOs: 51 and 56; and the second antigen binding domain comprises one or more EC domains of CD4 comprising an amino acid sequence that comprises or is at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99%, identical to a CD4 EC domain selected from the group consisting of SEQ ID NOs: 746-749.

85. The multi-specific antigen binding molecule of any one of claims 71 to 84, wherein the first antigen binding domain comprises a first VH and a first VL comprising the amino acid sequences set forth, respectively, or comprising amino acid sequences that are at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to the amino acid sequences set forth, respectively: SEQ ID NOs: 51 and 56; and the second antigen binding domain comprises one EC domain of CD4 comprising an amino acid sequence that comprises or is at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99%, identical to a CD4 EC domain of SEQ ID NO: 746.

86. The multi-specific antigen binding molecule of claim 85, wherein the first antigen binding domain comprises a first VH and a first VL comprising amino acid sequences that are at least 95% identical to the amino acid sequences set forth, respectively: SEQ ID NOs: 51 and 56; and the second antigen binding domain comprises one EC domain of CD4 comprising an amino acid sequence that is at least 95% identical to a CD4 EC domain of SEQ ID NO: 746.

87. The multi-specific antigen binding molecule of claim 86, wherein the first antigen binding domain comprises a first VH and a first VL comprising amino acid sequences that are at least 99% identical to the amino acid sequences set forth, respectively: SEQ ID NOs: 51 and 56; and the second antigen binding domain comprises one EC domain of CD4 comprising an amino acid sequence that is at least 99% identical to a CD4 EC domain of SEQ ID NO: 746.

88. The multi-specific antigen binding molecule of claim 87, wherein the first antigen binding domain comprises a first VH and a first VL comprising the amino acid sequences set forth, respectively: SEQ ID NOs: 51 and 56; and the second antigen binding domain comprises one EC domain of CD4 comprising an amino acid sequence of SEQ ID NO: 746.

89. The multi-specific antigen binding molecule of any one of claims 1 to 54 and 58 to 69, wherein the second antigen binding domain binds to an epitope or region of gp120 in the gp120/gp41 interface and competes with or comprises VH and VL regions from an antibody selected from the group consisting of PGT-151, CAP248-2B, 35O22, 8ANC195, ACS202, VRC34 and VRC34.01.

90. The multi-specific antigen binding molecule of any one of claims 1 to 54 and 58 to 69, wherein the second antigen binding domain binds to an epitope or region of the gp120 silent face and competes with or comprises VH and VL regions from an antibody selected from VRC-PG05 and SF12.

91. The multi-specific antigen binding molecule of any one of claims 1 to 54 and 58 to 69, wherein the second antigen binding domain binds to an epitope or region of gp41 in the membrane proximal region (MPER).

92. The multi-specific antigen binding molecule of claim 91, wherein the second antigen binding domain binds to an epitope or region of gp41 in the membrane proximal region (MPER) and competes with or comprises VH and VL regions from an

antibody selected from the group consisting of 10E8, 10E8v4, 10E8-5R-100cF, 4E10, DH511.11P, 2F5, 7b2, and LN01.

93. The multi-specific antigen binding molecule of any one of claims 1 to 54 and 58 to 66, wherein the second antigen binding domain binds to an epitope or region of the gp41 fusion peptide and competes with or comprises VH and VL regions from an antibody selected from the group consisting of VRC34 and ACS202.

94. The multi-specific antigen binding molecule of any one of claims 1 to 54, 58 to 69 and 89 to 93, wherein the second antigen binding domain comprises a second VH comprising a second VH-CDR1, a second VH-CDR2, and a second VH-CDR3; and a second VL comprising a second VL-CDR1, a second VL-CDR2, and a second VH-CDR3; comprising the amino acid sequences (according to Kabat) set forth, respectively, in:

a) SEQ ID NOs: 76, 77, 78, 79, 80 and 81;

b) SEQ ID NOs: 76, 82, 78, 79, 80 and 81;

c) SEQ ID NOs: 83, 84, 85, 86, 80 and 87;

d) SEQ ID NOs: 83, 88, 85, 86, 80 and 87;

e) SEQ ID NOs: 90, 91, 92, 93, 94 and 95;

f) SEQ ID NOs: 90, 91, 96, 93, 94 and 95;

g) SEQ ID NOs: 97, 98, 99, 100, 101 and 102;

h) SEQ ID NOs: 103, 104, 105, 106, 94 and 107;

i) SEQ ID NOs: 108, 109, 110, 111, 112 and 113;

j) SEQ ID NOs: 114, 115, 116, 117, 118 and 119;

k) SEQ ID NOs: 114, 120, 121, 122, 118 and 123;

l) SEQ ID NOs: 124, 125, 126, 127, 128 and 113;

m) SEQ ID NOs: 129, 115, 131, 127, 118 and 113;

n) SEQ ID NOs: 132, 133, 134, 135, 136 and 137;

o) SEQ ID NOs: 138, 139, 140, 141, 142 and 143;

p) SEQ ID NOs: 144, 145, 146, 147, 148 and 143;

q) SEQ ID NOs: 149, 150, 151, 152, 153 and 143;

r) SEQ ID NOs: 154, 155, 156, 157, 158 and 159;

s) SEQ ID NOs: 160, 161, 162, 163, 164 and 165;

t) SEQ ID NOs: 166, 161, 167, 163, 164 and 165;

u) SEQ ID NOs: 168, 169, 170, 171, 172 and 173;

v) SEQ ID NOs: 168, 174, 170, 171, 172 and 173;

w) SEQ ID NOs: 175, 176, 177, 171, 172 and 173;

x) SEQ ID NOs: 178, 179, 180, 181, 182 and 183;

y) SEQ ID NOs: 184, 185, 186, 187, 188 and 189;

z) SEQ ID NOs: 190, 191, 192, 193, 194 and 195;

aa) SEQ ID NOs: 196, 197, 198, 199, 200 and 201;

bb) SEQ ID NOs: 202, 203, 204, 205, 206 and 207;

cc) SEQ ID NOs: 208, 209, 210, 211, 212 and 213;

dd) SEQ ID NOs: 214, 215, 216, 217, 218 and 219;

ee) SEQ ID NOs: 214, 220, 216, 221, 218 and 219;

ff) SEQ ID NOs: 214, 220, 222, 221, 218 and 219;

gg) SEQ ID NOs: 223, 224, 225, 226, 227 and 228;

hh) SEQ ID NOs: 229, 230, 231, 232, 233 and 234;

ii) SEQ ID NOs: 902, 903, 904, 905, 906 and 907;

jj) SEQ ID NOs: 908, 909, 910, 911, 912 and 913;

kk) SEQ ID NOs: 914, 915, 916, 917, 918 and 919; or

ll) SEQ ID NOs: 920, 921, 922, 923, 924 and 925.

95. The multi-specific antigen binding molecule of any one of claims 1 to 54, 58 to 69 and 89 to 94, wherein the second antigen binding domain comprises a second VH comprising a second VH CDR1, a second VH CDR2, and a second VH CDR3; and a second VL comprising a second VL CDR1, a second VL CDR2, and a second VH CDR3; comprising the amino acid sequences (according to Chothia) set forth, respectively, in:

a) SEQ ID NOs: 235, 236, 237, 238, 239 and 240;

b) SEQ ID NOs: 241, 242, 243, 244, 239 and 245;

c) SEQ ID NOs: 246, 242, 247, 244, 239 and 245;

d) SEQ ID NOs: 248, 249, 250, 251, 239 and 252;

e) SEQ ID NOs: 248, 249, 253, 251, 239 and 252;

f) SEQ ID NOs: 254, 255, 256, 257, 258 and 259;

g) SEQ ID NOs: 260, 261, 262, 263, 239 and 264;

h) SEQ ID NOs: 265, 266, 267, 268, 269 and 270;

i) SEQ ID NOs: 271, 272, 273, 274, 275 and 270;

j) SEQ ID NOs: 271, 276, 277, 278, 275 and 279;

k) SEQ ID NOs: 280, 281, 282, 283, 284 and 270;

l) SEQ ID NOs: 285, 272, 286, 283, 275 and 270;

m) SEQ ID NOs: 287, 288, 289, 290, 291 and 292;

n) SEQ ID NOs: 293, 294, 295, 296, 297 and 298;

o) SEQ ID NOs: 299, 300, 301, 302, 303 and 298;

p) SEQ ID NOs: 304, 300, 305, 406, 307 and 298;

q) SEQ ID NOs: 308, 309, 310, 311, 312 and 313;

r) SEQ ID NOs: 314, 315, 316, 317, 318 and 165;

s) SEQ ID NOs: 320, 315, 321, 317, 318 and 165;

t) SEQ ID NOs: 322, 323, 324, 325, 326 and 327;

u) SEQ ID NOs: 322, 328, 324, 325, 326 and 327;

v) SEQ ID NOs: 329, 323, 330, 325, 326 and 327;

w) SEQ ID NOs: 331, 332, 333, 334, 335 and 336;

x) SEQ ID NOs: 337, 338, 339, 340, 341 and 342;

y) SEQ ID NOs: 343, 344, 345, 346, 341 and 347;

z) SEQ ID NOs:348, 349, 350, 351, 352 and 353;

aa) SEQ ID NOs: 354, 355, 356, 357, 358 and 359;

bb) SEQ ID NOs: 360, 361, 362, 363, 364 and 365;

cc) SEQ ID NOs: 366, 367, 368, 369, 370 and 371;

dd) SEQ ID NOs: 366, 361, 368, 369, 370 and 371;

ee) SEQ ID NOs: 372, 361, 373, 369, 370 and 371;

ff) SEQ ID NOs: 374, 375, 376, 377, 378 and 379;

gg) SEQ ID NOs: 380, 381, 382, 383, 384 and 385;

hh) SEQ ID NOs: 926, 927, 928, 929, 930 and 931;

ii) SEQ ID NOs: 932, 933, 934, 935, 936 and 937;

jj) SEQ ID NOs: 938, 939, 940, 941, 942 and 943; or

kk) SEQ ID NOs: 944, 945, 946, 947, 948 and 949.

96. The multi-specific antigen binding molecule of any one of claims 1 to 54, 58 to 69 and 89 to 95, wherein the second antigen binding domain comprises a second VH comprising a second VH CDR1, a second VH CDR2, and a second VH CDR3; and a second VL comprising a second VL CDR1, a second VL CDR2, and a second VH CDR3; comprising the amino acid sequences (according to IMGT) set forth, respectively, in:

a) SEQ ID NOs: 386, 387, 388, 389, 239 and 81;

b) SEQ ID NOs: 390, 391, 392, 393, 239 and 87;

c) SEQ ID NOs: 390, 391, 394, 393, 239 and 87;

d) SEQ ID NOs: 395, 396, 397, 393, 239 and 87;

e) SEQ ID NOs: 398, 399, 400, 401, 239 and 95;

f) SEQ ID NOs: 398, 399, 402, 401, 239 and 95;

g) SEQ ID NOs: 403, 404, 405, 406, 258 and 102;

h) SEQ ID NOs: 407, 408, 409, 410, 239 and 107;

i) SEQ ID NOs: 411, 412, 413, 414, 269 and 113;

j) SEQ ID NOs: 415, 416, 417, 418, 275 and 119;

k) SEQ ID NOs: 415, 419, 420, 421, 275 and 123;

l) SEQ ID NOs: 422, 423, 424, 425, 275 and 113;

m) SEQ ID NOs: 426, 416, 427, 425, 275 and 113;

n) SEQ ID NOs: 428, 429, 430, 431, 291 and 137;

o) SEQ ID NOs: 432, 433, 434, 435, 297 and 143;

p) SEQ ID NOs: 436, 437, 438, 439, 303 and 143;

q) SEQ ID NOs: 440, 437, 441, 442, 307 and 143;

r) SEQ ID NOs: 443, 444, 445, 446, 312 and 159;

s) SEQ ID NOs: 447, 448, 449, 450, 318 and 165;

t) SEQ ID NOs: 451, 448, 452, 450, 318 and 165;

u) SEQ ID NOs: 453, 454, 455, 456, 326 and 173;

v) SEQ ID NOs: 453, 457, 455, 456, 326 and 173;

w) SEQ ID NOs: 458, 459, 460, 456, 326 and 173;

x) SEQ ID NOs: 461, 462, 463, 464, 335 and 183;

y) SEQ ID NOs: 465, 466, 467, 468, 341 and 189;

z) SEQ ID NOs: 469, 470, 471, 472, 341 and 195;

aa) SEQ ID NOs: 473, 474, 475, 476, 352 and 201;

bb) SEQ ID NOs: 477, 478, 479, 480, 358 and 207;

cc) SEQ ID NOs: 481, 482, 483, 484, 364 and 213;

dd) SEQ ID NOs: 485, 486, 487, 488, 370 and 219;

ee) SEQ ID NOs: 485, 482, 487, 488, 370 and 219;

ff) SEQ ID NOs: 489, 482, 490, 488, 370 and 219;

gg) SEQ ID NOs: 491, 492, 493, 494, 378 and 228;

hh) SEQ ID NOs: 495, 496, 497, 498, 384 and 234;

ii) SEQ ID NOs: 950, 951, 952, 953, 930 and 907;

jj) SEQ ID NOs: 954, 955, 956, 957, 936 and 913;

kk) SEQ ID NOs: 958, 959, 960, 961, 942 and 919; or

ll) SEQ ID NOs: 962, 963, 964, 965, 948 and 925.

97. The multi-specific antigen binding molecule of any one of claims 1 to 54, 58 to 69 and 89 to 96, wherein the second antigen binding domain comprises a second

~~VH comprising a second VH-CDR1, a second VH-CDR2, and a second VH-CDR3; and a second VL comprising a second VL-CDR1, a second VL-CDR2, and a second VH-CDR3; comprising the amino acid sequences (according to Honegger) set forth, respectively, in:~~

~~a) SEQ ID NOs: 499, 500, 501, 238, 502 and 240;~~

~~b) SEQ ID NOs: 499, 503, 501, 238, 502 and 240;~~

~~c) SEQ ID NOs: 505, 506, 507, 244, 502 and 245;~~

~~d) SEQ ID NOs: 508, 509, 510, 244, 502 and 245;~~

~~e) SEQ ID NOs: 511, 512, 513, 251, 514 and 252;~~

~~f) SEQ ID NOs: 511, 512, 515, 251, 514 and 252;~~

~~g) SEQ ID NOs: 516, 517, 518, 257, 519 and 259;~~

~~h) SEQ ID NOs: 520, 521, 522, 264, 523 and 264;~~

~~i) SEQ ID NOs: 524, 525, 526, 268, 527 and 270;~~

~~j) SEQ ID NOs: 528, 529, 530, 274, 531 and 270;~~

~~k) SEQ ID NOs: 528, 532, 533, 278, 531 and 279;~~

~~l) SEQ ID NOs: 534, 535, 536, 283, 537 and 270;~~

~~m) SEQ ID NOs: 1090, 529, 538, 283, 531 and 270;~~

~~n) SEQ ID NOs: 539, 540, 541, 290, 542 and 292;~~

~~o) SEQ ID NOs: 543, 544, 545, 546, 547 and 298;~~

~~p) SEQ ID NOs: 548, 549, 550, 1091, 551 and 298;~~

~~q) SEQ ID NOs: 552, 553, 554, 555, 556 and 298;~~

~~r) SEQ ID NOs: 557, 558, 559, 311, 560 and 313;~~

~~s) SEQ ID NOs: 561, 562, 563, 564, 565 and 165;~~

~~t) SEQ ID NOs: 566, 562, 1092, 564, 567 and 165;~~

~~u) SEQ ID NOs: 568, 569, 570, 571, 572 and 327;~~

~~v) SEQ ID NOs: 568, 573, 570, 571, 572 and 327;~~

~~w) SEQ ID NOs: 574, 575, 576, 571, 572 and 327;~~

~~x) SEQ ID NOs: 577, 578, 579, 580, 581 and 336;~~

~~y) SEQ ID NOs: 582, 583, 584, 340, 585 and 342;~~

~~z) SEQ ID NOs: 586, 587, 588, 346, 589 and 347;~~

~~aa) SEQ ID NOs: 590, 591, 592, 351, 593 and 353;~~

~~bb) SEQ ID NOs: 594, 595, 596, 597, 598 and 359;~~

~~cc) SEQ ID NOs: 599, 600, 601, 602, 603 and 365;~~

~~dd) SEQ ID NOs: 604, 605, 606, 607, 608 and 371;~~

~~ee) SEQ ID NOs: 604, 609, 606, 607, 608 and 371;~~

~~ff) SEQ ID NOs: 610, 609, 611, 607, 608 and 371;~~

gg) SEQ ID NOs: 612, 613, 614, 615, 616 and 379;

hh) SEQ ID NOs: 617, 618, 619, 620, 621 and 385;

ii) SEQ ID NOs: 966, 967, 968, 969, 970 and 931;

jj) SEQ ID NOs: 971, 972, 973, 974, 975 and 937;

kk) SEQ ID NOs: 976, 977, 978, 941, 979 and 943; or

ll) SEQ ID NOs: 980, 981, 982, 983, 984 and 949.

98. The multi-specific antigen binding molecule of any one of claims 1 to 54, 58 to 69 and 89 to 97, wherein the second VH and the second VL comprise the amino acid sequences set forth, respectively, below, or comprise amino acid sequences that are at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to the amino acid sequences set forth, respectively, below:

a) SEQ ID NOs: 622 and 623;

b) SEQ ID NOs: 624 and 625;

c) SEQ ID NOs: 624 and 626;

d) SEQ ID NOs: 627 and 628;

e) SEQ ID NOs: 629 and 630;

f) SEQ ID NOs: 631 and 632;

g) SEQ ID NOs: 633 and 634;

h) SEQ ID NOs: 635 and 636;

i) SEQ ID NOs: 637 and 638;

j) SEQ ID NOs: 639 and 640;

k) SEQ ID NOs: 641 and 642;

l) SEQ ID NOs: 643 and 644;

m) SEQ ID NOs: 645 and 646;

n) SEQ ID NOs: 647 and 648;

o) SEQ ID NOs: 649 and 650;

p) SEQ ID NOs: 651 and 652;

q) SEQ ID NOs: 653 and 654;

r) SEQ ID NOs: 655 and 656;

s) SEQ ID NOs: 657 and 658;

t) SEQ ID NOs: 659 and 660;

u) SEQ ID NOs: 661 and 662;

v) SEQ ID NOs: 663 and 664;

w) SEQ ID NOs: 665 and 666;

x) SEQ ID NOs: 667 and 668;

y) SEQ ID NOs: 669 and 670;

z) SEQ ID NOs:671 and 672;

aa) SEQ ID NOs:673 and 670;

bb) SEQ ID NOs: 674 and 675;

cc) SEQ ID NOs: 676 and 677;

dd) SEQ ID NOs: 678 and 679;

ee) SEQ ID NOs: 680 and 681;

ff) SEQ ID NOs: 682 and 683;

gg) SEQ ID NOs: 684 and 685;

hh) SEQ ID NOs: 686 and 687;

ii) SEQ ID NOs: 688 and 689;

jj) SEQ ID NOs: 690 and 691;

kk) SEQ ID NOs: 692 and 693;

ll) SEQ ID NOs: 694 and 695;

mm) SEQ ID NOs: 985 and 986;

nn) SEQ ID NOs: 987 and 988;

oo) SEQ ID NOs: 989 and 990; or

pp) SEQ ID NOs: 991 and 992.

99. The multi-specific antigen binding molecule of any one of claims 1 to 54, 58 to 69 and 89 to 98, wherein the second VH and the second VL comprise amino acid sequences that are at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to the amino acid sequences set forth below, respectively, and comprising the following amino acids at the indicated positions (position numbering according to Kabat):

(i) SEQ ID NOs: 622, 624 or 627, comprising one or more of: Ser-Ser-Val (SSV) or Thr-Gly-Val (TGV) at positions 82a-82c, Gln (Q) at position 39, Asn (N) at position 60, His (H) at position 68, any one of Lys (K), His (H) or Thr (T) at position 105, Leu (L) at position 2, Ala (A) at position 32, and Ala (A) at position 95; and SEQ ID NOs: 623, 625, 626 or 628, comprising one or more of: Gly (G) at position 67, Tyr (Y), Phe (F) or Thr (T) at position 67a, Arg (R) at position 67b, Pro (P) at position 67c, and Lys (K) at position 103; or

(ii) SEQ ID NOs: 663, 665 or 667, comprising one or more of: His (H) at position 3, Ser (S) or Val (V) at position 5, Glu (E) at position 10, Lys (K) at position 12, Lys (K) at position 23, Asn (N) at position 28, Arg (R) at position 30, Tyr (Y) at position 32, Thr (T) at position 68, Met (M) at position 69, Gln (Q) or His (H) at position 72, Tyr (Y), Phe (F) at position 74a, Phe (F) or Ser (S) at position 76, Ser (S) at position 77, Ala (A) at position 78, Ser (S) at position 82a, Arg (R) at position 82b, Val (V) at position 82c, Ile (I) or Thr (T) at position 89, Phe (F) at position 98, Tyr (Y) or Gly (G) at position 99, Gln (Q) at position 105, Met (M) at position 108, Phe-Asp-Phe-Asp (FDFD) (SEQ ID NO: 1040) at positions 74a, 74b, 74c, and 74d and Trp-Asp-Phe-Asp (WDFD) (SEQ ID NO: 1042) at positions 74a, 74b, 74c, and 74d; and SEQ ID NOs: 664, 666 or 668, comprising one or more of Arg (R) at position 14, Arg (R) at position 18, Ala (A) at position 19, Lys (L) at position 39, Pro (P) at position 40, Thr (T) at position 56, Ala (A) at position 60, Ser (S) at position 65, Thr (T) or His (H) at position 72, Lys (K) at position 74, Ser (S) at position 76, Ser (S) at position 77, Val (V) at position 83, Ile (I) or Phe (F) at position 98, Thr (T) or Gly (G) at position 99, Asn (N) at position 103, and Ile (I) at position 106.

100. The multi-specific antigen binding molecule of any one of claims 1 to 54, 58 to 69 and 89 to 99, wherein the second VH and the second VL comprise amino acid sequences that are at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to the amino acid sequences set forth below, respectively, and comprising the following amino acids at the indicated positions (position numbering according to Kabat):

(i) SEQ ID NOs: 622, 624 or 627, comprising one or more of: Thr-Gly-Val (TGV) at positions 82a-82c, Asn (N) at position 60, His (H) at position 68, any one of Lys (K), His (H) and Thr (T) at position 105; and SEQ ID NOs: 623, 625, 626 or 628, comprising one or more of: Gly (G) at position 67, Tyr (Y), Phe (F) or Thr (T) at position 67a, Arg (R) at position 67b, Pro (P) at position 67c; or

(ii) SEQ ID NOs: 663, 665 or 667, comprising Phe (F) at position 74a; and SEQ ID NOs: 664, 666 or 668, comprising Ala (A) at position 19.

101. The multi-specific antigen binding molecule of any one of claims 1 to 100, comprising a heterodimeric human IgG1 or IgG4, comprising a first Fc region and a second Fc region.

102. The multi-specific antigen binding molecule of claim 101, wherein the first Fc region and the second Fc region are derived from IgG1m17.

~~103. The multi-specific antigen binding molecule of any one of claims 1 to 102, comprising a heterodimeric human IgG1 or IgG4, comprising a first Fc region and a second Fc region, wherein one or both of the first and second Fc regions comprise one or more of the following amino acids at the indicated positions (EU numbering):~~

~~(i) Alanine at position 234~~

~~(ii) Alanine at position 235; and~~

~~(iii) Serine at position 331.~~

~~104. The multi-specific antigen binding molecule of any one of claims 1 to 103, comprising a heterodimeric human IgG1 or IgG4, comprising a first Fc region and a second Fc region, wherein one or both of the first and second Fc regions comprise the following amino acids at the indicated positions (EU numbering):~~

~~(i) Tyrosine at position 252, threonine at position 254 and glutamic acid at position 256 (YTE); or~~

~~(ii) Leucine at position 428 and serine at position 434 (LS).~~

~~105. The multi-specific antigen binding molecule of any one of claims 1 to 104, comprising a heterodimeric human IgG1, comprising a first Fc region and a second Fc region, wherein both of the first and second Fc regions comprise the following amino acids at the indicated positions (EU numbering): Tyrosine at position 252, threonine at position 254 and glutamic acid at position 256 (YTE).~~

~~106. The multi-specific antigen binding molecule of any one of claims 1 to 105, comprising a heterodimeric human IgG1 or IgG4, comprising a first Fc region and a second Fc region, comprising the following amino acids at the indicated positions (EU numbering):~~

~~(i) the first Fc region comprises a tryptophan at position 366 (T366W); and the second Fc region comprises a serine at position 366 (T366S), an alanine at position 368 (L368A) and a valine at position 407 (Y407V);~~

~~(ii) the first Fc region comprises a serine at position 366 (T366S), an alanine at position 368 (L368A) and a valine at position 407 (Y407V); and the second Fc region comprises a tryptophan at position 366 (T366W);~~

~~(iii) the first Fc region comprises a cysteine at position 354 (S354C), a tryptophan at position 366 (T366W); and the second Fc region comprises a cysteine at position 349 (Y349C), a serine at position 366 (T366S), an alanine at position 368 (L368A) and a valine at position 407 (Y407V);~~

(iv) the first Fc region comprises cysteine at position 349 (Y349C), a serine at position 366 (T366S), an alanine at position 368 (L368A) and a valine at position 407 (Y407V); and the second Fc region comprises a cysteine at position 354 (S354C), a tryptophan at position 366 (T366W).

107. The multi-specific antigen binding molecule of any one of claims 1 to 106, comprising a heterodimeric human IgG1, comprising a first Fc region and a second Fc region, comprising the following amino acids at the indicated positions (EU numbering): the first Fc region comprises a serine at position 366 (T366S), an alanine at position 368 (L368A) and a valine at position 407 (Y407V); and the second Fc region comprises a tryptophan at position 366 (T366W).

108. The multi-specific antigen binding molecule of any one of claims 1 to 107, comprising a heterodimeric human IgG1 or IgG4, comprising a first hinge region and a second hinge region, wherein one or both of the first and second hinge regions comprise a serine at position 220 (C220S) (EU numbering).

109. The multi-specific antigen binding molecule of any one of claims 1 to 108, comprising a heterodimeric human IgG1 or IgG4, comprising a first Fc region and a second Fc region, wherein one of the first Fc region or the second Fc region comprise the following amino acids at the indicated positions (EU numbering):

(i) arginine at position 435 (H435R); or

(ii) arginine at position 435 (H435R) and phenylalanine at position 436 (Y436F).

110. The multi-specific antigen binding molecule of any one of claims 1 to 109, comprising a heterodimeric human IgG1, comprising a first Fc region and a second Fc region, wherein the first Fc region comprises the following amino acids at the indicated positions (EU numbering): arginine at position 435 (H435R).

111. The multi-specific antigen binding molecule of any one of claims 1 to 110, comprising a heterodimeric human IgG1 or IgG4, comprising a first Fc region and a second Fc region, comprising the following amino acids at the indicated positions (EU numbering):

(i) the first Fc region comprises an alanine at position 234 (L234), an alanine at position 235 (L235A), a serine at position 331 (P331S) and a tryptophan at position 366 (T366W); and the second Fc region comprises an alanine a position 234

(L234), an alanine at position 235 (L235A), a serine at position 331 (P331S), a serine at position 366 (T366S), an alanine at position 368 (L368A), a valine at position 407 (Y407V), and an arginine at position 435 (H435R);

(ii) the first Fc region comprises an alanine at position 234 (L234), an alanine at position 235 (L235A), a serine at position 331 (P331S) and a tryptophan at position 366 (T366W); and the second Fc region comprises an alanine a position 234 (L234), an alanine at position 235 (L235A), a serine at position 331 (P331S), a serine at position 366 (T366S), an alanine at position 368 (L368A), a valine at position 407 (Y407V), an arginine at position 435 (H435R) and a phenylalanine at position 436 (Y436F);

(iii) the first Fc region comprises an alanine at position 234 (L234), an alanine at position 235 (L235A), a serine at position 331 (P331S), a serine at position 366 (T366S), an alanine at position 368 (L368A), and a valine at position 407 (Y407V); and the second Fc region comprises an alanine at position 234 (L234), an alanine at position 235 (L235A), a serine at position 331 (P331S) and a tryptophan at position 366 (T366W);

(iv) the first Fc region comprises an alanine at position 234 (L234), an alanine at position 235 (L235A), a serine at position 331 (P331S), a tryptophan at position 366 (T366W), a leucine at position 428 (M428L) and a serine at position 434 (N434S); and the second Fc region comprises an alanine a position 234 (L234), an alanine at position 235 (L235A), a serine at position 331 (P331S), a serine at position 366 (T366S), an alanine at position 368 (L368A), a valine at position 407 (Y407V), and an arginine at position 435 (H435R); or

(v) the first Fc region comprises an alanine at position 234 (L234), an alanine at position 235 (L235A), a serine at position 331 (P331S), a tryptophan at position 366 (T366W), a tyrosine at position 252 (M252Y), a threonine at position 254 (S254T) and a glutamic acid at position 256 (T256E); and the second Fc region comprises an alanine a position 234 (L234), an alanine at position 235 (L235A), a serine at position 331 (P331S), a serine at position 366 (T366S), an alanine at position 368 (L368A), a valine at position 407 (Y407V), and an arginine at position 435 (H435R).

112. The multi-specific antigen binding molecule of any one of claims 1 to 111, comprising a heterodimeric human IgG1, comprising a first Fc region and a second Fc region, comprising the following amino acids at the indicated positions (EU numbering): the first Fc region comprises an alanine a position 234 (L234), an alanine at position 235 (L235A), a serine at position 331 (P331S), a serine at position 366 (T366S), an alanine at position 368 (L368A), a valine at position 407 (Y407V), and an arginine at position 435

(H435R); and the second Fc region comprises an alanine at position 234 (L234), an alanine at position 235 (L235A), a serine at position 331 (P331S), a tryptophan at position 366 (T366W), a tyrosine at position 252 (M252Y), a threonine at position 254 (S254T) and a glutamic acid at position 256 (T256E).

113. The multi-specific antigen binding molecule of any one of claims 1 to 112, comprising a heterodimeric human IgG1, comprising a first Fc region and a second Fc region, comprising amino acid sequences set forth, respectively, below, or comprising amino acid sequences that are at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to the amino acid sequences set forth, respectively, below:

a) SEQ ID NOs.: 696 and 697;
b) SEQ ID NOs.: 697 and 696;
c) SEQ ID NOs.: 696 and 698;
d) SEQ ID NOs.: 698 and 696;
e) SEQ ID NOs.: 699 and 700;
f) SEQ ID NOs.: 700 and 699;
g) SEQ ID NOs.: 701 and 698;
h) SEQ ID NOs.: 698 and 701;
i) SEQ ID NOs.: 702 and 703;
j) SEQ ID NOs.: 703 and 702;
k) SEQ ID NOs.: 704 and 698;
l) SEQ ID NOs.: 698 and 704;
m) SEQ ID NOs.: 705 and 703;
n) SEQ ID NOs.: 703 and 705;
o) SEQ ID NOs.: 706 and 704;
p) SEQ ID NOs.: 704 and 706;
q) SEQ ID NOs.: 707 and 703;
r) SEQ ID NOs.: 703 and 707;
s) SEQ ID NOs.: 708 and 704;
t) SEQ ID NOs.: 704 and 708;
u) SEQ ID NOs.: 709 and 710; or
v) SEQ ID NOs.: 710 and 709.

114. The multi-specific antigen binding molecule of any one of claims 1 to 113, comprising a heterodimeric human IgG1, comprising a first Fc region and a second Fc

region, comprising amino acid sequences that are at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to the amino acid sequences set forth, respectively: SEQ ID NOs.: 703 and 705.

115. The multi-specific antigen binding molecule of any one of claims 1 to 114, comprising a heterodimeric human IgG1, comprising a first Fc region and a second Fc region, comprising amino acid sequences that are at least 95% identical to the amino acid sequences set forth, respectively: SEQ ID NOs.: 703 and 705.

116. The multi-specific antigen binding molecule of any one of claims 1 to 115, comprising a heterodimeric human IgG1, comprising a first Fc region and a second Fc region, comprising amino acid sequences that are at least 99% identical to the amino acid sequences set forth, respectively: SEQ ID NOs.: 703 and 705.

117. The multi-specific antigen binding molecule of any one of claims 1 to 116, comprising a heterodimeric human IgG1, comprising amino acid sequences set forth, respectively: SEQ ID NOs.: 703 and 705.

118. The multi-specific antigen binding molecule of any one of claims 1 to 117, wherein the first antigen binding domain is a scFv and the second antigen binding domain is a Fab, wherein the first antigen binding domain comprises a first heavy chain (HC), and the second antigen binding domain comprises a second HC and a light chain (LC), the first HC, the second HC and the LC comprising the amino acid sequences set forth, respectively, below, or comprising amino acid sequences that are at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to the amino acid sequences set forth, respectively, below:

1) SEQ ID NOs: 800, 801 and 802;
2) SEQ ID NOs: 800, 803 and 802;
3) SEQ ID NOs: 804, 803 and 802;
4) SEQ ID NOs: 804, 805 and 802;
5) SEQ ID NOs: 806, 801 and 802;
6) SEQ ID NOs: 806, 803 and 802;
7) SEQ ID NOs: 807, 803 and 802;
8) SEQ ID NOs: 807, 805 and 802;
9) SEQ ID NOs: 808, 809 and 802;

~~10) SEQ ID NOs: 808, 810 and 802;~~

~~11) SEQ ID NOs: 811, 801 and 802;~~

~~12) SEQ ID NOs: 812, 809 and 802;~~

~~13) SEQ ID NOs: 812, 810 and 802;~~

~~14) SEQ ID NOs: 813, 805 and 802;~~

~~15) SEQ ID NOs: 812, 814 and 802;~~

~~16) SEQ ID NOs: 815, 801 and 802;~~

~~17) SEQ ID NOs: 816, 805 and 802;~~

~~18) SEQ ID NOs: 817, 801 and 802;~~

~~19) SEQ ID NOs: 818, 805 and 802;~~

~~20) SEQ ID NOs: 819, 810 and 802;~~

~~21) SEQ ID NOs: 820, 810 and 802;~~

~~22) SEQ ID NOs: 821, 822 and 823;~~

~~23) SEQ ID NOs: 824, 825 and 823;~~

~~24) SEQ ID NOs: 826, 825 and 823;~~

~~25) SEQ ID NOs: 826, 827 and 823;~~

~~26) SEQ ID NOs: 828, 829 and 823;~~

~~27) SEQ ID NOs: 830, 822 and 823;~~

~~28) SEQ ID NOs: 830, 825 and 823;~~

~~29) SEQ ID NOs: 831, 825 and 823;~~

~~30) SEQ ID NOs: 831, 827 and 823;~~

~~31) SEQ ID NOs: 832, 833 and 823;~~

~~32) SEQ ID NOs: 832, 829 and 823;~~

~~33) SEQ ID NOs: 834, 827 and 823;~~

~~34) SEQ ID NOs: 835, 829 and 823;~~

~~35) SEQ ID NOs: 836, 829 and 823;~~

~~36) SEQ ID NOs: 837, 833 and 823;~~

~~37) SEQ ID NOs: 837, 838 and 823;~~

~~38) SEQ ID NOs: 839, 840 and 823;~~

~~39) SEQ ID NOs: 841, 829 and 823;~~

~~40) SEQ ID NOs: 842, 829 and 823;~~

~~41) SEQ ID NOs: 843, 829 and 823;~~

~~42) SEQ ID NOs: 844, 829 and 823;~~

~~43) SEQ ID NOs: 845, 829 and 823;~~

~~44) SEQ ID NOs: 846, 829 and 823;~~

~~45) SEQ ID NOs: 846, 833 and 823;~~

~~46) SEQ ID NOs: 846, 838 and 823;~~

~~47) SEQ ID NOs: 847, 827 and 823;~~

~~48) SEQ ID NOs: 848, 829 and 823;~~

~~49) SEQ ID NOs: 849, 829 and 823;~~

~~50) SEQ ID NOs: 850, 829 and 823;~~

~~51) SEQ ID NOs: 851, 829 and 823;~~

~~52) SEQ ID NOs: 852, 829 and 823;~~

~~53) SEQ ID NOs: 853, 829 and 823;~~

~~54) SEQ ID NOs: 854, 829 and 823;~~

~~55) SEQ ID NOs: 855, 829 and 823;~~

~~56) SEQ ID NOs: 856, 829 and 823;~~

~~57) SEQ ID NOs: 857, 829 and 823;~~

~~58) SEQ ID NOs: 858, 829 and 823;~~

~~59) SEQ ID NOs: 859, 829 and 823;~~

~~60) SEQ ID NOs: 860, 829 and 823;~~

~~61) SEQ ID NOs: 861, 862 and 863;~~

~~62) SEQ ID NOs: 861, 864 and 863;~~

~~63) SEQ ID NOs: 865, 864 and 863;~~

~~64) SEQ ID NOs: 865, 866 and 863;~~

~~65) SEQ ID NOs: 867, 868 and 863;~~

~~66) SEQ ID NOs: 869, 862 and 863;~~

~~67) SEQ ID NOs: 869, 864 and 863;~~

~~68) SEQ ID NOs: 870, 864 and 863;~~

~~69) SEQ ID NOs: 870, 866 and 863;~~

~~70) SEQ ID NOs: 871, 872 and 863;~~

~~71) SEQ ID NOs: 871, 868 and 863;~~

~~72) SEQ ID NOs: 873, 862 and 863;~~

~~73) SEQ ID NOs: 874, 866 and 863;~~

~~74) SEQ ID NOs: 875, 872 and 863;~~

~~75) SEQ ID NOs: 875, 868 and 863;~~

~~76) SEQ ID NOs: 875, 876 and 863;~~

~~77) SEQ ID NOs: 877, 862 and 863;~~

~~78) SEQ ID NOs: 878, 866 and 863;~~

~~79) SEQ ID NOs: 879, 862 and 863;~~

80) SEQ ID NOs: 880, 866 and 863;

81) SEQ ID NOs: 881, 882 and 883;

82) SEQ ID NOs: 881, 884 and 883;

83) SEQ ID NOs: 885, 884 and 883;

84) SEQ ID NOs: 885, 886 and 883;

85) SEQ ID NOs: 887, 888 and 883;

86) SEQ ID NOs: 889, 882 and 883;

87) SEQ ID NOs: 889, 884 and 883;

88) SEQ ID NOs: 890, 884 and 883;

89) SEQ ID NOs: 890, 886 and 883;

90) SEQ ID NOs: 891, 892 and 883;

91) SEQ ID NOs: 891, 888 and 883;

92) SEQ ID NOs: 893, 882 and 883;

93) SEQ ID NOs: 894, 886 and 883;

94) SEQ ID NOs: 895, 892 and 883;

95) SEQ ID NOs: 895, 888 and 883;

96) SEQ ID NOs: 895, 896 and 883;

97) SEQ ID NOs: 897, 882 and 883;

98) SEQ ID NOs: 898, 886 and 883;

99) SEQ ID NOs: 899, 882 and 883; or

100) SEQ ID NOs: 900, 886 and 883.

119. The multi-specific antigen binding molecule of any one of claims 1 to 118, wherein the first antigen binding domain is a scFv and the second antigen binding domain is a Fab, wherein the first antigen binding domain comprises a first heavy chain (HC), and the second antigen binding domain comprises a second HC and a light chain (LC), the first HC, the second HC and the LC comprising the amino acid sequences set forth, respectively, below, or comprising amino acid sequences that are at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to the amino acid sequences set forth, respectively, below:

1) SEQ ID NOs: 800, 801 and 802;

2) SEQ ID NOs: 800, 803 and 802;

3) SEQ ID NOs: 804, 803 and 802;

4) SEQ ID NOs: 804, 805 and 802;

5) SEQ ID NOs: 806, 801 and 802;

6) SEQ ID NOs: 806, 803 and 802;

7) SEQ ID NOs: 807, 803 and 802;

8) SEQ ID NOs: 807, 805 and 802;

9) SEQ ID NOs: 808, 809 and 802;

10) SEQ ID NOs: 808, 810 and 802;

11) SEQ ID NOs: 821, 822 and 823;

12) SEQ ID NOs: 824, 825 and 823;

13) SEQ ID NOs: 826, 825 and 823;

14) SEQ ID NOs: 826, 827 and 823;

15) SEQ ID NOs: 828, 829 and 823;

16) SEQ ID NOs: 830, 822 and 823;

17) SEQ ID NOs: 830, 825 and 823;

18) SEQ ID NOs: 831, 825 and 823;

19) SEQ ID NOs: 831, 827 and 823;

20) SEQ ID NOs: 832, 833 and 823;

21) SEQ ID NOs: 832, 829 and 823;

22) SEQ ID NOs: 861, 862 and 863;

23) SEQ ID NOs: 861, 864 and 863;

24) SEQ ID NOs: 865, 864 and 863;

25) SEQ ID NOs: 865, 866 and 863;

26) SEQ ID NOs: 867, 868 and 863;

27) SEQ ID NOs: 869, 862 and 863;

28) SEQ ID NOs: 869, 864 and 863;

29) SEQ ID NOs: 870, 864 and 863;

30) SEQ ID NOs: 870, 866 and 863;

31) SEQ ID NOs: 871, 872 and 863;

32) SEQ ID NOs: 871, 868 and 863;

33) SEQ ID NOs: 881, 882 and 883;

34) SEQ ID NOs: 881, 884 and 883;

35) SEQ ID NOs: 885, 884 and 883;

36) SEQ ID NOs: 885, 886 and 883;

37) SEQ ID NOs: 887, 888 and 883;

38) SEQ ID NOs: 889, 882 and 883;

39) SEQ ID NOs: 889, 884 and 883;

40) SEQ ID NOs: 890, 884 and 883;

41) SEQ ID NOs: 890, 886 and 883;

42) SEQ ID NOs: 891, 892 and 883; or

43) SEQ ID NOs: 891, 888 and 883.

120. The multi-specific antigen binding molecule of any one of claims 1 to 119, wherein the first antigen binding domain is a scFv and the second antigen binding domain is a Fab, wherein the first antigen binding domain comprises a first heavy chain (HC), and the second antigen binding domain comprises a second HC and a light chain (LC), the first HC, the second HC and the LC comprising the amino acid sequences set forth, respectively, below, or comprising amino acid sequences that are at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to the amino acid sequences set forth, respectively, below:

1) SEQ ID NOs: 800, 801 and 802;

2) SEQ ID NOs: 800, 803 and 802;

3) SEQ ID NOs: 804, 803 and 802;

4) SEQ ID NOs: 804, 805 and 802;

5) SEQ ID NOs: 821, 822 and 823;

6) SEQ ID NOs: 824, 825 and 823;

7) SEQ ID NOs: 826, 825 and 823;

8) SEQ ID NOs: 826, 827 and 823;

9) SEQ ID NOs: 828, 829 and 823;

10) SEQ ID NOs: 861, 862 and 863;

11) SEQ ID NOs: 861, 864 and 863;

12) SEQ ID NOs: 865, 864 and 863;

13) SEQ ID NOs: 865, 866 and 863;

14) SEQ ID NOs: 867, 868 and 863;

15) SEQ ID NOs: 881, 882 and 883;

16) SEQ ID NOs: 881, 884 and 883;

17) SEQ ID NOs: 885, 884 and 883;

18) SEQ ID NOs: 885, 886 and 883; or

19) SEQ ID NOs: 887, 888 and 883.

121. The multi-specific antigen binding molecule of any one of claims 1 to 120, wherein the first antigen binding domain is a scFv and the second antigen binding

~~domain is a Fab, wherein the first antigen binding domain comprises a first heavy chain (HC), and the second antigen binding domain comprises a second HC and a light chain (LC), the first HC, the second HC and the LC comprising the amino acid sequences set forth, respectively, below, or comprising amino acid sequences that are at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to the amino acid sequences set forth, respectively, below:~~

~~1) SEQ ID NOs: 800, 801 and 802;~~

~~2) SEQ ID NOs: 800, 803 and 802;~~

~~3) SEQ ID NOs: 804, 803 and 802;~~

~~4) SEQ ID NOs: 804, 805 and 802;~~

~~5) SEQ ID NOs: 821, 822 and 823;~~

~~6) SEQ ID NOs: 824, 825 and 823;~~

~~7) SEQ ID NOs: 826, 825 and 823;~~

~~8) SEQ ID NOs: 826, 827 and 823;~~

~~9) SEQ ID NOs: 828, 829 and 823;~~

~~10) SEQ ID NOs: 861, 862 and 863;~~

~~11) SEQ ID NOs: 861, 864 and 863;~~

~~12) SEQ ID NOs: 865, 864 and 863;~~

~~13) SEQ ID NOs: 865, 866 and 863; or~~

~~14) SEQ ID NOs: 867, 868 and 863.~~

~~122. A multi-specific antigen binding molecule that binds to human CD3 and HIV gp120, wherein the antigen binding molecule comprises:~~

~~(a) a first antigen binding domain that comprises a first heavy chain variable domain (VH) and a first light chain variable domain (VL), wherein the first antigen binding domain binds to CD3; and~~

~~(b) a second antigen binding domain that binds to HIV gp120 comprising one or more extracellular (EC) domain of CD4, wherein the one or more EC domains of CD4 comprise a sequence as set forth below, or a sequence that is at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to a sequence selected from the group consisting of:~~

(i) KKVVYGKKGDTVELTCTASQKKNIQFHWKNSNQIKILGNQGSFLTKGPSKLNDRV DSRRSLWDQGNFPLIIKNLKPEDSDTYICEVEDQKEEVQLVVVG (SEQ ID NO: 746);

(ii) KKVVYGKKGDTVELTCTASQKKNIQFHWKNSNQIKILGNQGSFLTKGPSKLNDRV DSRRSLWDQGNFPLIIKNLKPEDSDTYICEVEDQKEEVQLVVVGGGGSGKKVVYG KKGDTVELTCTASQKKNIQFHWKNSNQIKILGNQGSFLTKGPSKLNDRVDSRRSL WDQGNFPLIIKNLKPEDSDTYICEVEDQKEEVQLVVVG (SEQ ID NO: 747);

(iii) KKVVLGKKGDTVELTCTASQKKSIQFHWKNSNQIKILGNQGSFLTKGPSKLNDRA DSRRSLWDQGNFPLIIKNLKIEDSDTYICEVEDQKEEVQLLVFG (SEQ ID NO: 748); or

(iv) KKVVLGKKGDTVELTCTASQKKSIQFHWKNSNQIKILGNQGSFLTKGPSKLNDRA DSRRSLWDQGNFPLIIKNLKIEDSDTYICEVEDQKEEVQLLVFGGGGSGKKVVLG KKGDTVELTCTASQKKSIQFHWKNSNQIKILGNQGSFLTKGPSKLNDRADSRRSL WDQGNFPLIIKNLKIEDSDTYICEVEDQKEEVQLLVFG(SEQ ID NO: 749).

123. The multi-specific antigen binding molecule of claim 122, wherein the one or more EC domains of CD4 comprise a sequence as set forth below, or a sequence that is at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to the sequence of SEQ ID NO: 746.

124. The multi-specific antigen binding molecule of any one of claims 1 to 88, 101 to 117 and 122 to 123, wherein the first antigen binding domain is a Fab and the second antigen binding domain is a scFv or an EC domain of CD4 wherein the first antigen binding domain comprises a first HC and a LC, and the second antigen binding domain comprises a second HC, the second HC, the first HC and the LC comprising the amino acid sequences set forth, respectively, below, or comprising amino acid sequences that are at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to the amino acid sequences set forth, respectively, below:

1) SEQ ID NOs: 751, 752 and 753;

2) SEQ ID NOs: 754, 752 and 753;

3) SEQ ID NOs: 755, 756 and 753;

4) SEQ ID NOs: 755, 757 and 753;

~~5) SEQ ID NOs: 758, 757 and 753;~~

~~6) SEQ ID NOs: 759, 756 and 753;~~

~~7) SEQ ID NOs: 754, 760 and 761;~~

~~8) SEQ ID NOs: 762, 760 and 761;~~

~~9) SEQ ID NOs: 751, 763 and 753;~~

~~10) SEQ ID NOs: 764, 752 and 753;~~

~~11) SEQ ID NOs: 765, 752 and 753;~~

~~12) SEQ ID NOs: 766, 767 and 753;~~

~~13) SEQ ID NOs: 766, 768 and 753;~~

~~14) SEQ ID NOs: 769, 768 and 753;~~

~~15) SEQ ID NOs: 770, 767 and 753;~~

~~16) SEQ ID NOs: 765, 771 and 761;~~

~~17) SEQ ID NOs: 772, 771 and 761;~~

~~18) SEQ ID NOs: 774, 775 and 776;~~

~~19) SEQ ID NOs: 777, 778 and 776;~~

~~20) SEQ ID NOs: 779, 778 and 776;~~

~~21) SEQ ID NOs: 779, 780 and 776;~~

~~22) SEQ ID NOs: 777, 781 and 776;~~

~~23) SEQ ID NOs: 782, 752 and 753;~~

~~24) SEQ ID NOs: 783, 752 and 753;~~

~~25) SEQ ID NOs: 784, 785 and 753;~~

~~26) SEQ ID NOs: 784, 786 and 753;~~

~~27) SEQ ID NOs: 787, 786 and 753;~~

~~28) SEQ ID NOs: 788, 785 and 753;~~

~~29) SEQ ID NOs: 783, 789 and 761;~~

~~30) SEQ ID NOs: 790, 789 and 761;~~

~~31) SEQ ID NOs: 792, 793 and 794;~~

~~32) SEQ ID NOs: 795, 796 and 794;~~

~~33) SEQ ID NOs: 797, 796 and 794;~~

~~34) SEQ ID NOs: 797, 798 and 794; or~~

~~35) SEQ ID NOs: 795, 799 and 794.~~

~~125. The multi-specific antigen binding molecule of any one of claims 1 to 88, 101 to 117 and 122 to 124, wherein the first antigen binding domain is a Fab and the second antigen binding domain is a scFv or an EC domain of CD4 wherein the first antigen~~

~~binding domain comprises a first HC and a LC, and the second antigen binding domain comprises a second HC, the second HC, the first HC and the LC comprising the amino acid sequences set forth, respectively, below, or comprising amino acid sequences that are at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to the amino acid sequences set forth, respectively, below:~~

~~1) SEQ ID NOs: 751, 752 and 753;~~

~~2) SEQ ID NOs: 754, 752 and 753;~~

~~3) SEQ ID NOs: 755, 756 and 753;~~

~~4) SEQ ID NOs: 755, 757 and 753;~~

~~5) SEQ ID NOs: 758, 757 and 753;~~

~~6) SEQ ID NOs: 759, 756 and 753;~~

~~7) SEQ ID NOs: 764, 752 and 753;~~

~~8) SEQ ID NOs: 765, 752 and 753;~~

~~9) SEQ ID NOs: 766, 767 and 753;~~

~~10) SEQ ID NOs: 766, 768 and 753;~~

~~11) SEQ ID NOs: 769, 768 and 753;~~

~~12) SEQ ID NOs: 770, 767 and 753;~~

~~13) SEQ ID NOs: 777, 778 and 776;~~

~~14) SEQ ID NOs: 779, 778 and 776;~~

~~15) SEQ ID NOs: 779, 780 and 776;~~

~~16) SEQ ID NOs: 777, 781 and 776;~~

~~17) SEQ ID NOs: 782, 752 and 753;~~

~~18) SEQ ID NOs: 783, 752 and 753;~~

~~19) SEQ ID NOs: 784, 785 and 753;~~

~~20) SEQ ID NOs: 784, 786 and 753;~~

~~21) SEQ ID NOs: 787, 786 and 753;~~

~~22) SEQ ID NOs: 788, 785 and 753;~~

~~23) SEQ ID NOs: 795, 796 and 794;~~

~~24) SEQ ID NOs: 797, 796 and 794;~~

~~25) SEQ ID NOs: 797, 798 and 794; or~~

~~26) SEQ ID NOs: 795, 799 and 794.~~

~~126. The multi-specific antigen binding molecule of any one of claims 1 to 88, 101 to 117 and 122 to 125, wherein the first antigen binding domain is a Fab and the~~

second antigen binding domain is a scFv or an EC domain of CD4 wherein the first antigen binding domain comprises a first HC and a LC, and the second antigen binding domain comprises a second HC, the second HC, the first HC and the LC comprising the amino acid sequences set forth, respectively, below, or comprising amino acid sequences that are at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to the amino acid sequences set forth, respectively, below:

1) SEQ ID NOs: 751, 752 and 753;

2) SEQ ID NOs: 754, 752 and 753;

3) SEQ ID NOs: 755, 756 and 753;

4) SEQ ID NOs: 755, 757 and 753;

5) SEQ ID NOs: 758, 757 and 753; or

6) SEQ ID NOs: 759, 756 and 753.

127. The multi-specific antigen binding molecule of any one of claims 1 to 88, 101 to 117 and 122 to 126, wherein the first antigen binding domain is a Fab and the second antigen binding domain is a scFv or an EC domain of CD4 wherein the first antigen binding domain comprises a first HC and a LC, and the second antigen binding domain comprises a second HC, the second HC, the first HC and the LC comprising the amino acid sequences set forth, respectively, below, or comprising amino acid sequences that are at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to the amino acid sequences set forth, respectively, below:

1) SEQ ID NOs: 751, 752 and 753; or

2) SEQ ID NOs: 755, 756 and 753.

128. The multi-specific antigen binding molecule of any one of claims 1 to 88, 101 to 117 and 122 to 127, wherein the first antigen binding domain is a Fab and the second antigen binding domain is an EC domain of CD4 wherein the first antigen binding domain comprises a first HC and a LC, and the second antigen binding domain comprises a second HC, the second HC, the first HC and the LC comprising amino acid sequences that are at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to the amino acid sequences set forth, respectively: SEQ ID NOs: 751, 752 and 753.

~~129. The multi-specific antigen binding molecule of any one of claims 1 to 88, 101 to 117 and 122 to 128 , wherein the first antigen binding domain is a Fab and the second antigen binding domain is an EC domain of CD4 wherein the first antigen binding domain comprises a first HC and a LC, and the second antigen binding domain comprises a second HC, the second HC, the first HC and the LC comprising amino acid sequences that are at least 95% identical to the amino acid sequences set forth, respectively: SEQ ID NOs: 751, 752 and 753.~~

~~130. The multi-specific antigen binding molecule of any one of claims 1 to 88, 101 to 117 and 122 to 129, wherein the first antigen binding domain is a Fab and the second antigen binding domain is an EC domain of CD4 wherein the first antigen binding domain comprises a first HC and a LC, and the second antigen binding domain comprises a second HC, the second HC, the first HC and the LC comprising amino acid sequences that are at least 99% identical to the amino acid sequences set forth, respectively: SEQ ID NOs: 751, 752 and 753.~~

~~131. The multi-specific antigen binding molecule of any one of claims 1 to 88, 101 to 117 and 122 to 130, wherein the first antigen binding domain is a Fab and the second antigen binding domain is an EC domain of CD4 wherein the first antigen binding domain comprises a first HC and a LC, and the second antigen binding domain comprises a second HC, the second HC, the first HC and the LC comprising the amino acid sequences set forth, respectively: SEQ ID NOs: 751, 752 and 753.~~

~~132. The multi-specific antigen binding molecule of any one of claims 1 to 131, wherein the multi-specific antigen binding molecule is a bispecific antigen binding molecule.~~

~~133. The multi-specific antigen binding molecule of claim 132, binding to or targeting human CD3 and HIV gp120.~~

~~134. The multi-specific antigen binding molecule of any one of claims 1 to 133, wherein the first VH and the first VL have at least 80%, 81%, 82%, 83%, 84%, 85%, or more, sequence similarity to a human germline VH and a human germline VL, respectively.~~

~~135. The multi-specific antigen binding molecule of any one of claims 1 to 134, wherein the first antigen binding domain has reduced or insignificant or substantially no binding to Protein A, or does not detectably bind to Protein A.~~

136. The multi-specific antigen binding molecule of any one of claims 1 to 134, wherein the first antigen binding domain binds to Protein A with a K_D of greater than 10^{-6} M.

137. The multi-specific antigen binding molecule of any one of claims 1 to 136, wherein the first antigen binding domain binds to CD3 with a K_D of lower than 10 nM, *e.g.*, lower than 9.5 nM, 9.0 nM, 8.5 nM, 8.0 nM, 7.5 nM, 7.0 nM, 6.5 nM, 6.0 nM, 5.5 nM, 5.0 nM, 4.5 nM, 4.0 nM, 3.5 nM, 3.0 nM, or lower.

138. The multi-specific antigen binding molecule of claim 137, wherein the first antigen binding domain binds to CD3 with a KD of lower than 3.0 nM (*e.g.*, 2.5 nM).

139. The multi-specific antigen binding molecule of any one of claims 1 to 137, wherein the antigen binding molecule has a serum half-life in a human or cynomolgus monkey of at least 3 days, *e.g.*, at least 4 days, at least 5 days, at least 6 days, at least 7 days, at least 8 days, at least 9 days, at least 10 days, at least 11 days, at least 12 days, at least 13 days, at least 14 days, at least 15 days, at least 16 days, or longer.

140. The multi-specific antigen binding molecule of any one of claims 1 to 139, wherein the antigen binding molecule has a serum half-life in a human or cynomolgus monkey of at least 7 days.

141. The multi-specific antigen binding molecule of any one of claims 1 to 139, wherein the first antigen binding domain binds to CD3 with a K_D of lower than 7.0 nM, *e.g.*, lower than 6.5 nM, 6.0 nM, 5.5 nM, 5.0 nM, 4.5 nM, 4.0 nM, 3.5 nM, 3.0 nM, or lower, and the antigen binding molecule has a serum half-life in a human or cynomolgus monkey of at least at least 5 days, *e.g.*, at least 5.5 days, at least 6 days, at least 6.5 days, at least 7 days, at least 7.5 days, at least 8 days, at least 8.5 days, at least 9 days, at least 10 days, at least 11 days, at least 12 days, at least 13 days, at least 14 days, or longer.

142. The multi-specific antigen binding molecule of any one of claims 1 to 141, wherein the first antigen binding domain binds to CD3 with a KD of lower 3.0 nM (*e.g.*, 2.5 nM), and the antigen binding molecule has a serum half-life in a human or cynomolgus monkey of at least 7 days.

143. The multi-specific antigen binding molecule of any one of claims 1 to 142, wherein at least 50%, at least 60%, at least 70%, least 80%, at least 85%, at least 90%,

or more, N-linked glycosylation sites in at least one of the first VH, the first VL, the second VH and the second VL are sialylated.

144. The multi-specific antigen binding molecule of any one of claims 1 to 143, wherein the N-linked glycosylation sites in at least one of the first VH, the first VL, the second VH and the second VL have a sialic acid occupancy (*e.g.*, a glycan comprising one or two terminal sialic acid residues) of at least 40%, at least 50%, at least 60%, at least 70%, least 80%, at least 85%, at least 90%, or more.

145. The multi-specific antigen binding molecule of any one of claims 143 to 144, wherein the sialylated N-linked glycosylation sites in at least one of the first VH, the first VL, the second VH and the second VL comprise from 1 to 5 sialic acid residues, *e.g.*, from 1 to 4 sialic acid residues, *e.g.*, from 1 to 3 sialic acid residues, *e.g.*, from 1 to 2 sialic acid residues.

146. The multi-specific antigen binding molecule of any one of claims 143 to 145, wherein at least one of the first VH, the first VL, the second VH and the second VL are sialylated with N-acetylneuraminic acid (NANA).

147. The multi-specific antigen binding molecule of any one of claims 143 to 146, wherein the sialic acid residues are present in biantennary structures.

148. The multi-specific antigen binding molecule of any one of claims 143 to 147, wherein the sialic acid residues are present in complex N-linked glycan structures.

149. The multi-specific antigen binding molecule of any one of claims 143 to 147, wherein the sialic acid residues are present in hybrid N-linked glycan structures.

150. The multi-specific antigen binding molecule of any one of claims 143 to 147, wherein the glycans are terminally sialylated.

151. A polynucleotide or multiple polynucleotides encoding the first VH and the first VL of the multi-specific antigen binding molecule claimed in any one of claims 1 to 124.

152. The polynucleotide or polynucleotides of claim 151, further comprising a polynucleotide or multiple polynucleotides encoding the second VH and the second VL of the multi-specific antigen binding molecule claimed in any one of claims 64 to 132.

153. The polynucleotide or polynucleotides of any one of claims 151 to 152, comprising a polynucleotide or multiple polynucleotides encoding the HC of the first antigen binding domain that is an scFv, and the HC and LC of the second antigen binding domain that is a Fab, of the multi-specific antigen binding molecule of any one of claims 64 to 121.

154. The polynucleotide or polynucleotides of any one of claims 151 to 152, comprising a polynucleotide or multiple polynucleotides encoding the HC and LC of the first antigen binding domain that is a Fab, and the HC of the second antigen binding domain that is an scFv or an EC domain of CD4, of the multi-specific antigen binding molecule of any one of claims 64 to 132.

155. The polynucleotide or polynucleotides of any one of claims 151 to 154, encoding a multi-specific antigen binding molecule of any one of claims 122 to 132, comprising the following polynucleotide sequences, or polynucleotide sequences that are at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to the polynucleotide sequences set forth, respectively, below:

i. SEQ ID NOs: 995, 996 and 997;
ii. SEQ ID NOs: 998, 999 and 1000;
iii. SEQ ID NOs: 1001, 1002 and 1003;
iv. SEQ ID NOs: 1004, 1005 and 1000;
v. SEQ ID NOs: 1006, 1002 and 997;
vi. SEQ ID NOs: 1007, 1093 and 1000;
vii. SEQ ID NOs: 998, 1008 and 1000;
viii. SEQ ID NOs: 998, 1009 and 1000;
ix. SEQ ID NOs: 1010, 1011 and 1012;
x. SEQ ID NOs: 1013, 1014 and 1015;
xi. SEQ ID NOs: 1016, 1017 and 1012;
xii. SEQ ID NOs: 1018, 1019 and 1012;
xiii. SEQ ID NOs: 1018, 1020 and 1012;
xiv. SEQ ID NOs: 1021, 1022 and 1023; or
xv. SEQ ID NOs: 1024, 1025 and 1023.

156. The polynucleotide or polynucleotides of any one of claims 151 to 155, encoding a multi-specific antigen binding molecule of any one of claims 122 to 132,

~~comprising the following polynucleotide sequences, or polynucleotide sequences that are at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to the polynucleotide sequences set forth, respectively: SEQ ID NOs: 995, 996 and 997.~~

~~157. The polynucleotide or polynucleotides of claim 156, comprising polynucleotide sequences that are at least 95% identical to the polynucleotide sequences set forth, respectively: SEQ ID NOs: 995, 996 and 997.~~

~~158. The polynucleotide or polynucleotides of any one of claims 156 to 157, comprising polynucleotide sequences that are at least 99% identical to the polynucleotide sequences set forth, respectively: SEQ ID NOs: 995, 996 and 997.~~

~~159. The polynucleotide or polynucleotides of any one of claims 156 to 158, comprising the following polynucleotide sequences, respectively: SEQ ID NOs: 995, 996 and 997.~~

~~160. The polynucleotide or polynucleotides of any one of claims 151 to 155, encoding a multi-specific antigen binding molecule of any one of claims 122 to 132, comprising the following polynucleotide sequences, or polynucleotide sequences that are at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to the polynucleotide sequences set forth, respectively: SEQ ID NOs: 998, 999 and 1000.~~

~~161. The polynucleotide or polynucleotides of claim 156, comprising polynucleotide sequences that are at least 95% identical to the polynucleotide sequences set forth, respectively: SEQ ID NOs: 998, 999 and 1000.~~

~~162. The polynucleotide or polynucleotides of any one of claims 156 to 157, comprising polynucleotide sequences that are at least 99% identical to the polynucleotide sequences set forth, respectively: SEQ ID NOs: 998, 999 and 1000.~~

~~163. The polynucleotide or polynucleotides of any one of claims 156 to 158, comprising the following polynucleotide sequences, respectively: SEQ ID NOs: 998, 999 and 1000.~~

~~164. The polynucleotide or polynucleotides of any one of claims 151 to 163, wherein the polynucleotide or polynucleotides are comprised of DNA or RNA.~~

~~165. The polynucleotide or polynucleotides of any one of claims 151 to 164, wherein the polynucleotide or polynucleotides are comprised of mRNA.~~

~~166. The polynucleotide or polynucleotides of any one of claims 151 to 165, comprising codon bias for efficient expression in a human cell.~~

~~167. A lipoplex, *e.g.*, a lipid nanoparticle (LNP), comprising the polynucleotide or polynucleotides of any one of claims 151 to 166.~~

~~168. An expression cassette or multiple expression cassettes comprising one or more regulatory sequences operably linked to the polynucleotide or polynucleotides of any one of claims 151 to 166.~~

~~169. An expression vector or multiple expression vectors comprising one or more regulatory sequences operably linked to the polynucleotide or polynucleotides of any one of claims 151 to 166, or the expression cassette or expression cassettes of claim 168.~~

~~170. The expression vector or expression vectors of claim 169, wherein the expression vector or expression vectors comprise a plasmid vector or a viral vector.~~

~~171. The expression vector of any one of claims 169 to 170, wherein the expression vector comprises:~~

~~(i) a first expression cassette comprising a first polynucleotide encoding an anti-HIV gp120 VL-CL fusion protein;~~

~~(ii) a second expression cassette comprising a second polynucleotide encoding an anti-HIV gp120 VH-Fc fusion protein; and~~

~~(iii) a third expression cassette comprising a third polynucleotide encoding an anti-CD3 scFv-Fc fusion protein.~~

~~172. The expression vector of any one of claims 169 to 170, wherein the expression vector comprises in sequential order from 5′ to 3′:~~

~~(i) a first expression cassette comprising a first polynucleotide encoding an anti-HIV gp120 VL-CL fusion protein;~~

~~(ii) a second expression cassette comprising a second polynucleotide encoding an anti-HIV gp120 VH-Fc fusion protein; and~~

~~(iii) a third expression cassette comprising a third polynucleotide encoding an anti-CD3 scFv-Fc fusion protein.~~

~~173. The expression vector of any one of claims 171 to 172, wherein the anti-HIV gp120 VL-CL fusion protein, the anti-HIV gp120 VH-Fc fusion protein and the anti-CD3 scFv-Fc fusion protein comprise amino acid sequences set forth, respectively, below, or comprise amino acid sequences that are at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to the amino acid sequences set forth, respectively, below:~~

~~1) SEQ ID NOs: 802, 801 and 800;~~

~~2) SEQ ID NOs: 802, 803 and 800;~~

~~3) SEQ ID NOs: 802, 803 and 804;~~

~~4) SEQ ID NOs: 802, 805 and 804;~~

~~5) SEQ ID NOs: 802, 801 and 806;~~

~~6) SEQ ID NOs: 802, 803 and 806;~~

~~7) SEQ ID NOs: 802, 803 and 807;~~

~~8) SEQ ID NOs: 802, 805 and 807;~~

~~9) SEQ ID NOs: 802, 809 and 808;~~

~~10) SEQ ID NOs: 802, 810 and 808;~~

~~11) SEQ ID NOs: 802, 801 and 811;~~

~~12) SEQ ID NOs: 802, 809 and 812;~~

~~13) SEQ ID NOs: 802, 810 and 812;~~

~~14) SEQ ID NOs: 802, 805 and 813;~~

~~15) SEQ ID NOs: 802, 814 and 812;~~

~~16) SEQ ID NOs: 802, 801 and 815;~~

~~17) SEQ ID NOs: 802, 805 and 816;~~

~~18) SEQ ID NOs: 802, 801 and 817;~~

~~19) SEQ ID NOs: 802, 805 and 818;~~

~~20) SEQ ID NOs: 802, 810 and 819;~~

~~21) SEQ ID NOs: 802, 810 and 820;~~

~~22) SEQ ID NOs: 823, 822 and 821;~~

~~23) SEQ ID NOs: 823, 825 and 824;~~

~~24) SEQ ID NOs: 823, 825 and 826;~~

~~25) SEQ ID NOs: 823, 827 and 826;~~

~~26) SEQ ID NOs: 823, 829 and 828;~~

~~27) SEQ ID NOs: 823, 822 and 830;~~

~~28) SEQ ID NOs: 823, 825 and 830;~~

~~29) SEQ ID NOs: 823, 825 and 831;~~

~~30) SEQ ID NOs: 823, 827 and 831;~~

~~31) SEQ ID NOs: 823, 833 and 832;~~

~~32) SEQ ID NOs: 823, 829 and 832;~~

~~33) SEQ ID NOs: 823, 827 and 834;~~

~~34) SEQ ID NOs: 823, 829 and 835;~~

~~35) SEQ ID NOs: 823, 829 and 836;~~

~~36) SEQ ID NOs: 823, 833 and 837;~~

~~37) SEQ ID NOs: 823, 838 and 837;~~

~~38) SEQ ID NOs: 823, 840 and 839;~~

~~39) SEQ ID NOs: 823, 829 and 841;~~

~~40) SEQ ID NOs: 823, 829 and 842;~~

~~41) SEQ ID NOs: 823, 829 and 843;~~

~~42) SEQ ID NOs: 823, 829 and 844;~~

~~43) SEQ ID NOs: 823, 829 and 845;~~

~~44) SEQ ID NOs: 823, 829 and 846;~~

~~45) SEQ ID NOs: 823, 833 and 846;~~

~~46) SEQ ID NOs: 823, 838 and 846;~~

~~47) SEQ ID NOs: 823, 827 and 847;~~

~~48) SEQ ID NOs: 823, 829 and 848;~~

~~49) SEQ ID NOs: 823, 829 and 849;~~

~~50) SEQ ID NOs: 823, 829 and 850;~~

~~51) SEQ ID NOs: 823, 829 and 851;~~

~~52) SEQ ID NOs: 823, 829 and 852;~~

~~53) SEQ ID NOs: 823, 829 and 853;~~

~~54) SEQ ID NOs: 823, 829 and 854;~~

~~55) SEQ ID NOs: 823, 829 and 855;~~

~~56) SEQ ID NOs: 823, 829 and 856;~~

~~57) SEQ ID NOs: 823, 829 and 857;~~

~~58) SEQ ID NOs: 823, 829 and 858;~~

~~59) SEQ ID NOs: 823, 829 and 859;~~

~~60) SEQ ID NOs: 823, 829 and 860;~~

~~61) SEQ ID NOs: 863, 862 and 861;~~

~~62) SEQ ID NOs: 863, 864 and 861;~~

~~63) SEQ ID NOs: 863, 864 and 865;~~

64) SEQ ID NOs: 863, 866 and 865;

65) SEQ ID NOs: 863, 868 and 867;

66) SEQ ID NOs: 863, 862 and 869;

67) SEQ ID NOs: 863, 864 and 869;

68) SEQ ID NOs: 863, 864 and 870;

69) SEQ ID NOs: 863, 866 and 870;

70) SEQ ID NOs: 863, 872 and 871;

71) SEQ ID NOs: 863, 868 and 871;

72) SEQ ID NOs: 863, 862 and 873;

73) SEQ ID NOs: 863, 866 and 874;

74) SEQ ID NOs: 863, 872 and 875;

75) SEQ ID NOs: 863, 868 and 875;

76) SEQ ID NOs: 863, 876 and 875;

77) SEQ ID NOs: 863, 862 and 877;

78) SEQ ID NOs: 863, 866 and 878;

79) SEQ ID NOs: 863, 862 and 879;

80) SEQ ID NOs: 863, 866 and 880;

81) SEQ ID NOs: 883, 882 and 881;

82) SEQ ID NOs: 883, 884 and 881;

83) SEQ ID NOs: 883, 884 and 885;

84) SEQ ID NOs: 883, 886 and 885;

85) SEQ ID NOs: 883, 888 and 887;

86) SEQ ID NOs: 883, 882 and 889;

87) SEQ ID NOs: 883, 884 and 889;

88) SEQ ID NOs: 883, 884 and 890;

89) SEQ ID NOs: 883, 886 and 890;

90) SEQ ID NOs: 883, 892 and 891;

91) SEQ ID NOs: 883, 888 and 891;

92) SEQ ID NOs: 883, 882 and 883;

93) SEQ ID NOs: 883, 886 and 894;

94) SEQ ID NOs: 883, 892 and 895;

95) SEQ ID NOs: 883, 888 and 895;

96) SEQ ID NOs: 883, 896 and 895;

97) SEQ ID NOs: 883, 882 and 897;

98) SEQ ID NOs: 883, 886 and 898;

99) SEQ ID NOs: 883, 882 and 899; or

100) SEQ ID NOs: 883, 886 and 900.

174. The expression vector of any one of claims 169 to 170, wherein the expression vector comprises:

(i) a first expression cassette comprising a first polynucleotide encoding an anti-CD3 VL-CL fusion protein;

(ii) a second expression cassette comprising a second polynucleotide encoding an anti-CD3 VH-Fc fusion protein; and

(iii) a third expression cassette comprising a third polynucleotide encoding a CD4 extracellular (EC) domain-Fc fusion protein.

175. The expression vector of any one of claims 169 to 170, wherein the expression vector comprises in sequential order from 5′ to 3′:

(i) a first expression cassette comprising a first polynucleotide encoding an anti-CD3 VL-CL fusion protein;

(ii) a second expression cassette comprising a second polynucleotide encoding an anti-CD3 VH-Fc fusion protein; and

(iii) a third expression cassette comprising a third polynucleotide encoding a CD4 EC domain-Fc fusion protein.

176. The expression vector of any one of claims 174 to 175, wherein the anti-CD3 VL-CL fusion protein, the anti-CD3 VH-Fc fusion protein and the CD4 EC domain-Fc fusion protein comprise amino acid sequences set forth, respectively, below, or comprise amino acid sequences that are at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to the amino acid sequences set forth, respectively, below:

1) SEQ ID NOs: 753, 752 and 751;

2) SEQ ID NOs: 753, 752 and 754;

3) SEQ ID NOs: 753, 756 and 755;

4) SEQ ID NOs: 753, 757 and 755;

5) SEQ ID NOs: 753, 757 and 758;

6) SEQ ID NOs: 753, 756 and 759;

7) SEQ ID NOs: 761, 760 and 754;

8) SEQ ID NOs: 761, 760 and 762;

9) SEQ ID NOs: 753, 763 and 751;

10) SEQ ID NOs: 753, 752 and 764;

11) SEQ ID NOs: 753, 752 and 765;

12) SEQ ID NOs: 753, 767 and 766;

13) SEQ ID NOs: 753, 768 and 766;

14) SEQ ID NOs: 753, 768 and 769;

15) SEQ ID NOs: 753, 767 and 770;

16) SEQ ID NOs: 761, 771 and 765;

17) SEQ ID NOs: 761, 771 and 772;

18) SEQ ID NOs: 776, 775 and 774;

19) SEQ ID NOs: 776, 778 and 777;

20) SEQ ID NOs: 776, 778 and 779;

21) SEQ ID NOs: 776, 780 and 779;

22) SEQ ID NOs: 776, 781 and 777;

23) SEQ ID NOs: 753, 752 and 782;

24) SEQ ID NOs: 753, 752 and 783;

25) SEQ ID NOs: 753, 785 and 784;

26) SEQ ID NOs: 753, 786 and 784;

27) SEQ ID NOs: 753, 786 and 787;

28) SEQ ID NOs: 753, 785 and 788;

29) SEQ ID NOs: 761, 789 and 783;

30) SEQ ID NOs: 761, 789 and 790;

31) SEQ ID NOs: 794, 793 and 792;

32) SEQ ID NOs: 794, 796 and 795;

33) SEQ ID NOs: 794, 796 and 797;

34) SEQ ID NOs: 794, 798 and 797; or

35) SEQ ID NOs: 794, 799 and 795.

177. The expression vector of claim 176, wherein the anti-CD3 VL-CL fusion protein, the anti-CD3 VH-Fc fusion protein and the CD4 EC domain-Fc fusion protein comprise amino acid sequences set forth, respectively, or comprise amino acid sequences that are at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to the amino acid sequences set forth, respectively: SEQ ID NOs: 753, 752 and 751.

178. The expression vector of claim 177, wherein the anti-CD3 VL-CL fusion protein, the anti-CD3 VH-Fc fusion protein and the CD4 EC domain-Fc fusion protein comprise amino acid sequences that are at least 95% identical to the amino acid sequences set forth, respectively: SEQ ID NOs: 753, 752 and 751.

179. The expression vector of claim 178, wherein the anti-CD3 VL-CL fusion protein, the anti-CD3 VH-Fc fusion protein and the CD4 EC domain-Fc fusion protein comprise amino acid sequences that are at least 99% identical to the amino acid sequences set forth, respectively: SEQ ID NOs: 753, 752 and 751.

180. The expression vector of claim 179, wherein the anti-CD3 VL-CL fusion protein, the anti-CD3 VH-Fc fusion protein and the CD4 EC domain-Fc fusion protein comprise amino acid sequences set forth, respectively: SEQ ID NOs: 753, 752 and 751.

181. The expression vector of any one of claims 169 to 180, wherein the first, second and third expression cassettes each comprise a promoter of equivalent transcription strength, *e.g.*, a constitutive promoter, *e.g.*, a promoter selected from cytomegalovirus (CMV), SV40, RSV, EF1a, UBC, PGK and CAGG.

182. The expression vector of any one of claims 169 to 180, further comprising a fourth expression cassette positioned 5′ to the first expression cassette comprising a polynucleotide encoding a eukaryotic selection marker protein, *e.g.*, glutamine synthetase (GS).

183. A cell or population of cells, comprising the polynucleotide or polynucleotides of any one of claims 151 to 166, the expression cassette or multiple expression cassettes of claim 168, or the expression vector or expression vectors of any one of claims 169 to 182.

184. The cell or population of cells of claim 183, wherein the cell or population of cells comprises a eukaryotic cell.

185. The cell or population of cells of any one of claims 183 to 184, wherein the cell or population of cells comprises a mammalian cell, an insect cell, a plant cell or a yeast cell.

~~186. The cell or population of cells of any one of claims 183 to 185, wherein the mammalian cell is a Chinese Hamster Ovary (CHO) cell.~~

~~187. The cell or population of cells of any one of claims 183 to 185, wherein the mammalian cell is a human cell.~~

~~188. The cell or population of cells of claim 187, wherein the cell is a human embryonic kidney cell.~~

~~189. The cell or population of cells of any one of claims 183 to 188, wherein the cell predominantly sialylates N-linked glycosylation sites in the variable domains (Fv) of expressed antigen binding molecules.~~

~~190. The cell or population of cells of claim 189, wherein at least 50%, at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, or more, N-linked glycosylation sites in the variable domains (Fv) of expressed antigen binding molecules are sialylated.~~

~~191. A pharmaceutical composition comprising one or more multi-specific antigen binding molecules claimed in any one of claims 1 to 149, and a pharmaceutically acceptable carrier.~~

~~192. A pharmaceutical composition comprising one or more polynucleotides of any one of claims 151 to 166 encoding one or more multi-specific antigen binding molecules of any one of claims 1 to 149, or the lipoplex (*e.g.*, LNP) of claim 167, and a pharmaceutically acceptable carrier.~~

~~193. The pharmaceutical composition of any one of claims 191 to 192, wherein the composition comprises an aqueous formulation.~~

~~194. The pharmaceutical composition of claim 193, comprising one or more multi-specific antigen binding molecules claimed in any one of claims 1 to 149 at a concentration of from 0.1 mg/ml to 150 mg/ml, *e.g.*, 0.1 mg/ml to 100 mg/ml, *e.g.*, 1 mg/ml to 100 mg/ml, *e.g.*, from 5 mg/ml to 60 mg/ml, *e.g.*, from 20 mg/ml to 150 mg/ml, or from 10 mg/ml to 50 mg/ml.~~

~~195. The pharmaceutical composition of any one of claims 191 to 192, wherein the composition is lyophilized.~~

196. The pharmaceutical composition of any one of claims 191 to 195, further comprising a second agent for treating an HIV infection.

197. The pharmaceutical composition of claim 196, further comprising a toll-like receptor (TLR) agonist or an IL-15 receptor agonist.

198. The pharmaceutical composition of claim 197, comprising a multi-specific antigen binding molecule of any one of claims 70 to 84 and an IL-15 receptor agonist.

199. The pharmaceutical composition of claim 197, wherein the TLR agonist is a TLR2 agonist, a TLR3 agonist, a TLR7 agonist, a TLR8 agonist or a TLR9 agonist.

200. The pharmaceutical composition of claim 199, wherein the TLR7 agonist is selected from the group consisting of vesatolimod, imiquimod, and resiquimod.

201. The pharmaceutical composition of claim 199, wherein the TLR8 agonist is selected from the group consisting of selgantolimod (GS-9688), motolimod and resiquimod.

202. The pharmaceutical composition of claim 199, wherein the TLR9 agonist is selected from the group consisting of cavrotolimod, cobitolimod, agatolimod, leftolimod, litenimod and tilsotolimod.

203. The pharmaceutical composition of any one of claims 191 to 202, comprising a first multi-specific antigen binding molecule and second or additional antigen binding molecules, wherein the first multi-specific antigen binding molecule and the second or additional antigen binding molecules bind to different epitopes or regions of gp120 selected from the group consisting of:

(i) third variable loop (V3) (*e.g.*, high mannose patch) comprising a N332 oligomannose glycan;

(ii) second variable loop (V2) (*e.g.*, Env trimer apex);

(iii) CD4 binding site (CD4bs);

(iv) gp120/gp41 interface; or

(v) silent face of gp120.

204. The pharmaceutical composition of claim 203, wherein the first multi-specific antigen binding molecule binds to the third variable loop (V3) (*e.g.*, high mannose patch) comprising a N332-oligomannose glycan and the second antigen binding molecule binds to the CD4 binding site (CD4bs).

205. The pharmaceutical composition of any one of claims 203 to 204, wherein the first multi-specific antigen binding molecule competes with or comprises VH and VL regions from an antibody selected from the group consisting of GS-9722 (elipovimab), GS-2872, PGT-121, PGT-121.66, PGT-121.414, PGT-122, PGT-123, PGT-124, PGT-125, PGT-126, PGT-128, PGT-130, PGT-133, PGT-134, PGT-135, PGT-136, PGT-137, PGT-138, PGT-139, 10-1074, 10-1074-J, VRC24, 2G12, BG18, 354BG8, 354BG18, 354BG42, 354BG33, 354BG129, 354BG188, 354BG411, 354BG426, DH270.1, DH270.6, PGDM12, VRC41.01, PGDM21, PCDN-33A, BF520.1 and VRC29.03, and the second antigen binding molecule competes with or comprises VH and VL regions from an antibody selected from the group consisting of GS-9723, GS-5423, 3BNC117, 3BNC60, b12, F105, VRC01, VRC07, VRC07-523, VRC03, VRC06, VRC06b01 VRC08, VRC0801, NIH45-46, PGV04 (*a.k.a.*, VRC-PG04); CH103, 44-VRC13.01, 1NC9, 12A12, N6, 1-18, N49-P7, NC-Cow1, IOMA, CH235 and CH235.12, N49P6, N49P7, N49P11, N49P9 and N60P25.

206. The pharmaceutical composition of any one of claims 203 to 205, wherein the first multi-specific antigen binding molecule competes with or comprises VH and VL regions from an antibody selected from the group consisting of 10-1074, 10-1074-J, GS-9722 (elipovimab), GS-2872, PGT-121, PGT-121.66, PGT-121.414 and PGT-134, and the second antigen binding molecule competes with or comprises VH and VL regions from an antibody selected from the group consisting of GS-9723, GS-5423, 3BNC117, VRC07 and VRC07-523.

207. The pharmaceutical composition of any one of claims 203 to 205, wherein the first multi-specific antigen binding molecule competes with or comprises VH and VL regions from an antibody selected from the group consisting of 10-1074, 10-1074-J, GS-9722 (elipovimab), GS-2872, PGT-121, PGT-121.66, PGT-121.414 and PGT-134, and the second antigen binding molecule comprises an EC domain of CD4.

208. The pharmaceutical composition of claim 203, wherein the first multi-specific antigen binding molecule binds to the CD4 binding site (CD4bs) and the

second antigen binding molecule binds to the third variable loop (V3) (*e.g.*, high mannose patch) comprising a N332 oligomannose glycan.

209. The pharmaceutical composition of claim 208, wherein the first multi-specific antigen binding molecule competes with or comprises VH and VL regions from an antibody selected from the group consisting of GS-9723, GS-5423, 3BNC117, 3BNC60, b12, F105, VRC01, VRC07, VRC07-523, VRC03, VRC06, VRC06b01 VRC08, VRC0801, NIH45-46, PGV04 (*a.k.a.*, VRC-PG04); CH103, 44-VRC13.01, 1NC9, 12A12, N6, 1-18, N49-P7, NC-Cow1, IOMA, CH235 and CH235.12, N49P6, N49P7, N49P11, N49P9 and N60P25, and the second antigen binding molecule competes with or comprises VH and VL regions from an antibody selected from the group consisting of GS-9722 (elipovimab), GS-2872, PGT-121, PGT-121.66, PGT-121.414, PGT-122, PGT-123, PGT-124, PGT-125, PGT-126, PGT-128, PGT-130, PGT-133, PGT-134, PGT-135, PGT-136, PGT-137, PGT-138, PGT-139, 10-1074, 10-1074-J, VRC24, 2G12, BG18, 354BG8, 354BG18, 354BG42, 354BG33, 354BG129, 354BG188, 354BG411, 354BG426, DH270.1, DH270.6, PGDM12, VRC41.01, PGDM21, PCDN-33A, BF520.1 and VRC29.03.

210. The pharmaceutical composition of any one of claims 208 to 209, wherein the first multi-specific antigen binding molecule competes with or comprises VH and VL regions from an antibody selected from the group consisting of GS-9723, GS-5423, 3BNC117, VRC07 and VRC07-523, and the second antigen binding molecule competes with or comprises VH and VL regions from an antibody selected from the group consisting of 10-1074, 10-1074-J, GS-9722 (elipovimab), GS-2872, PGT-121, PGT-121.66, PGT-121.414 and PGT-134.

211. The pharmaceutical composition of claim 208, wherein the first multi-specific antigen binding molecule competes with or comprises an EC domain of CD4, and the second antigen binding molecule competes with or comprises VH and VL regions from an antibody selected from the group consisting of GS-9722 (elipovimab), GS-2872, PGT-121, PGT-121.66, PGT-121.414, PGT-122, PGT-123, PGT-124, PGT-125, PGT-126, PGT-128, PGT-130, PGT-133, PGT-134, PGT-135, PGT-136, PGT-137, PGT-138, PGT-139, 10-1074, 10-1074-J, VRC24, 2G12, BG18, 354BG8, 354BG18, 354BG42, 354BG33, 354BG129, 354BG188, 354BG411, 354BG426, DH270.1, DH270.6, PGDM12, VRC41.01, PGDM21, PCDN-33A, BF520.1 and VRC29.03.

212. The pharmaceutical composition of any one of claims 208 and 211, wherein the first multi-specific antigen binding molecule competes with or comprises an EC

~~domain of CD4, and the second antigen binding molecule competes with or comprises VH and VL regions from an antibody selected from the group consisting of 10-1074, 10-1074-J, GS-9722 (elipovimab), GS-2872, PGT-121, PGT-121.66, PGT-121.414 and PGT-134.~~

~~213. The pharmaceutical composition of any one of claims 208 and 211 to 212, further comprising second antigen binding molecule that competes with or comprises VH and VL regions from an antibody selected from the group consisting of GS-9723, GS-5423, 3BNC117, 3BNC60, b12, F105, VRC01, VRC07, VRC07-523, VRC03, VRC06, VRC06b01 VRC08, VRC0801, NIH45-46, PGV04 (*a.k.a.*, VRC-PG04); CH103, 44-VRC13.01, 1NC9, 12A12, N6, 1-18, N49-P7, NC-Cow1, IOMA, CH235 and CH235.12, N49P6, N49P7, N49P11, N49P9 and N60P25.~~

~~214. The pharmaceutical composition of any one of claims 208 and 211 to 213, further comprising second antigen binding molecule competes with or comprises VH and VL regions from an antibody selected from the group consisting of GS-9723, GS-5423, 3BNC117, VRC07 and VRC07-523.~~

~~215. The pharmaceutical composition of any one of claims 208, 211 to 214, comprising:~~

- ~~(i) a multi-specific antigen binding molecule comprising an EC domain of CD4 of any one of claims 122 to 127;~~
- ~~(ii) an antibody or multi-specific antigen binding molecule that competes with or comprises VH and VL regions from an antibody selected from the group consisting of 10-1074, 10-1074-J, GS-9722 (elipovimab), GS-2872, PGT-121, PGT-121.66, PGT-121.414 and PGT-134; and~~
- ~~(iii) an antibody or multi-specific antigen binding molecule that competes with or comprises VH and VL regions from an antibody selected from the group consisting of GS-9723, GS-5423, 3BNC117, VRC07 and VRC07-523.~~

~~216. The pharmaceutical composition of any one of claims 191 to 215, comprising an additional multi-specific antigen binding molecule that competes with or comprises VH and VL regions from an antibody that binds to the gp120 second variable loop (V2) (*e.g.*, Env trimer apex).~~

~~217. The pharmaceutical composition of any one of claims 191 to 216, comprising an additional multi-specific antigen binding molecule that competes with or comprises VH and VL regions from an antibody selected from the group consisting of PG9, PG16, PGC14, PGG14, PGT-142, PGT-143, PGT-144, PGT-145, CH01, CH59, PGDM1400, CAP256, CAP256-VRC26.08, CAP256-VRC26.09, CAP256-VRC26.25, PCT64-24E and VRC38.01.~~

~~218. The pharmaceutical composition of any one of claims 191 to 217, comprising an additional multi-specific antigen binding molecule that competes with or comprises VH and VL regions from an antibody that binds to the gp120/gp41 interface.~~

~~219. The pharmaceutical composition of any one of claims 191 to 218, comprising an additional multi-specific antigen binding molecule that competes with or comprises VH and VL regions from an antibody selected from the group consisting of PGT-151, CAP248-2B, 35O22, 8ANC195, ACS202, VRC34 and VRC34.01.~~

~~220. The pharmaceutical composition of any one of claims 191 to 219, comprising an additional multi-specific antigen binding molecule that competes with or comprises VH and VL regions from an antibody that binds to an epitope or region of gp41 in the membrane proximal region (MPER).~~

~~221. The pharmaceutical composition of any one of claims 191 to 220, comprising an additional multi-specific antigen binding molecule that competes with or comprises VH and VL regions from an antibody selected from the group consisting of 10E8, 10E8v4, 10E8-5R-100cF, 4E10, DH511.11P, 2F5, 7b2, and LN01.~~

~~222. The pharmaceutical composition of any one of claims 191 to 221, comprising an additional antigen binding molecule or antigen binding fragment thereof that at least one of binds, inhibits, and neutralizes HIV, or a polynucleotide encoding the additional antigen binding molecule or antigen binding fragment thereof, wherein the additional antigen binding molecule or antigen binding fragment does not compete for binding to gp120 with the one or more multi-specific antigen binding molecules.~~

~~223. The pharmaceutical composition of any one of claims 191 to 222, formulated for intravenous, intramuscular or subcutaneous administration.~~

~~224. A kit comprising one or more containers comprising one or more of the multi-specific antigen binding molecules claimed in any one of claims 1 to 149, the~~

polynucleotide or polynucleotides of any one of claims 151 to 166 or the lipoplex (*e.g.*, LNP) of claim 167, the expression vector or expression vectors of any one of claims 169 to 182, or the pharmaceutical composition of any one of claims 191 to 223.

225. The kit of claim 224, comprising one or more unitary doses of the one or more multi-specific antigen binding molecules, or the polynucleotide or polynucleotides, in one or more containers.

226. The kit of any one of claims 224 to 225, comprising one or more unitary doses of the one or more multi-specific antigen binding molecules and a second agent for treating an HIV infection in separate containers.

227. The kit of claim 226, further comprising at least one of a toll-like receptor (TLR) agonist and an IL-15 receptor agonist.

228. The kit of claim 227, comprising a multi-specific antigen binding molecule of any one of claims 70 to 84 and an IL-15 receptor agonist.

229. The kit of claim 227, wherein the TLR agonist is a TLR2 agonist, a TLR3 agonist, a TLR7 agonist, a TLR8 agonist or a TLR9 agonist.

230. The kit of claim 229, wherein the TLR7 agonist is selected from the group consisting of vesatolimod, imiquimod, and resiquimod.

231. The kit of any one of claims 224 to 230, comprising a first multi-specific antigen binding molecule and second or additional antigen binding molecules, wherein the first multi-specific antigen binding molecule and the second or additional antigen binding molecules bind to different epitopes or regions of gp120 selected from the group consisting of:

(i) third variable loop (V3) (*e.g.*, high mannose patch) comprising a N332 oligomannose glycan;

(ii) second variable loop (V2) (*e.g.*, Env trimer apex);

(iii) CD4 binding site (CD4bs);

(iv) gp120/gp41 interface; or

(v) silent face of gp120.

232. The kit of claim 231, wherein the first multi-specific antigen binding molecule binds to the third variable loop (V3) (*e.g.*, high mannose patch) comprising a

N332 oligomannose glycan and the second or additional antigen binding molecules bind to the CD4 binding site (CD4bs).

233. The kit of any one of claims 231 to 232, wherein the first multi-specific antigen binding molecule competes with or comprises VH and VL regions from an antibody selected from the group consisting of GS-9722 (elipovimab), GS-2872, PGT-121, PGT-121.66, PGT-121.414, PGT-122, PGT-123, PGT-124, PGT-125, PGT-126, PGT-128, PGT-130, PGT-133, PGT-134, PGT-135, PGT-136, PGT-137, PGT-138, PGT-139, 10-1074, VRC24, 2G12, BG18, 354BG8, 354BG18, 354BG42, 354BG33, 354BG129, 354BG188, 354BG411, 354BG426, DH270.1, DH270.6, PGDM12, VRC41.01, PGDM21, PCDN-33A, BF520.1 and VRC29.03, and the second or additional antigen binding molecules compete with or comprise VH and VL regions from an antibody selected from the group consisting of GS-9723, GS-5423, 3BNC117, 3BNC60, b12, F105, VRC01, VRC07, VRC07-523, VRC03, VRC06, VRC06b01 VRC08, VRC0801, NIH45-46, PGV04 (*a.k.a.*, VRC-PG04), PGV04; CH103, 44-VRC13.01, 1NC9, 12A12, N6, 1-18, N49-P7, NC-Cow1, IOMA, CH235 and CH235.12, N49P6, N49P7, N49P11, N49P9 and N60P25.

234. The kit of any one of claims 231 to 233, wherein the first multi-specific antigen binding molecule competes with or comprises VH and VL regions from an antibody selected from the group consisting of 10-1074, 10-1074-J, GS-9722 (elipovimab), GS-2872, PGT-121, PGT-121.66, PGT-121.414 and PGT-134, and the second or additional antigen binding molecules compete with or comprise VH and VL regions from an antibody selected from the group consisting of GS-9723, GS-5423, 3BNC117, VRC07 and VRC07-523.

235. The kit of any one of claims 231 to 234, wherein the first multi-specific antigen binding molecule competes with or comprises VH and VL regions from an antibody selected from the group consisting of 10-1074, 10-1074-J, GS-9722 and PGT-121, and the second or additional antigen binding molecules comprise an EC domain of CD4.

236. The kit of claim 231, wherein the first multi-specific antigen binding molecule binds to the CD4 binding site (CD4bs) and the second or additional antigen binding molecules bind to the third variable loop (V3) (*e.g.*, high mannose patch) comprising a N332 oligomannose glycan.

237. The kit of claim 236, wherein the first multi-specific antigen binding molecule competes with or comprises VH and VL regions from an antibody selected from

the group consisting of GS-9723, GS-5423, 3BNC117, 3BNC60, b12, F105, VRC01, VRC07, VRC07-523, VRC03, VRC06, VRC06b01 VRC08, VRC0801, NIH45-46, PGV04 (*a.k.a.*, VRC-PG04); CH103, 44-VRC13.01, 1NC9, 12A12, N6, 1-18, N49-P7, NC-Cow1, IOMA, CH235 and CH235.12, N49P6, N49P7, N49P11, N49P9 and N60P25, and the second or additional antigen binding molecules compete with or comprise VH and VL regions from an antibody selected from the group consisting of GS-9722 (elipovimab), GS-2872, PGT-121, PGT-121.66, PGT-121.414, PGT-122, PGT-123, PGT-124, PGT-125, PGT-126, PGT-128, PGT-130, PGT-133, PGT-134, PGT-135, PGT-136, PGT-137, PGT-138, PGT-139, 10-1074, VRC24, 2G12, BG18, 354BG8, 354BG18, 354BG42, 354BG33, 354BG129, 354BG188, 354BG411, 354BG426, DH270.1, DH270.6, PGDM12, VRC41.01, PGDM21, PCDN-33A, BF520.1 and VRC29.03.

238. The kit of any one of claims 236 to 237, wherein the first multi-specific antigen binding molecule competes with or comprises VH and VL regions from an antibody selected from the group consisting of GS-9723, GS-5423, 3BNC117, VRC07 and VRC07-523, and the second or additional antigen binding molecules compete with or comprise VH and VL regions from an antibody selected from the group consisting of 10-1074, 10-1074 J, GS-9722 (elipovimab), GS-2872, PGT-121, PGT-121.66, PGT-121.414 and PGT-134.

239. The kit of claim 236, wherein the first multi-specific antigen binding molecule competes with or comprises an EC domain of CD4, and the second or additional antigen binding molecules compete with or comprise VH and VL regions from an antibody selected from the group consisting of GS-9722 (elipovimab), GS-2872, PGT-121, PGT-121.66, PGT-121.414, PGT-122, PGT-123, PGT-124, PGT-125, PGT-126, PGT-128, PGT-130, PGT-133, PGT-134, PGT-135, PGT-136, PGT-137, PGT-138, PGT-139, 10-1074, VRC24, 2G12, BG18, 354BG8, 354BG18, 354BG42, 354BG33, 354BG129, 354BG188, 354BG411, 354BG426, DH270.1, DH270.6, PGDM12, VRC41.01, PGDM21, PCDN-33A, BF520.1 and VRC29.03.

240. The kit of any one of claims 236 and 239, wherein the first multi-specific antigen binding molecule competes with or comprises an EC domain of CD4, and the second or additional antigen binding molecules compete with or comprise VH and VL regions from an antibody selected from the group consisting of 10-1074, 10-1074 J, GS-9722 (elipovimab), GS-2872, PGT-121, PGT-121.66, PGT-121.414 and PGT-134.

~~241. The kit of any one of claims 236 and 239 to 240, further comprising second or additional antigen binding molecules compete with or comprise VH and VL regions from an antibody selected from the group consisting of GS-9723, GS-5423, 3BNC117, 3BNC60, b12, F105, VRC01, VRC07, VRC07-523, VRC03, VRC06, VRC06b01 VRC08, VRC0801, NIH45-46, PGV04 (*a.k.a.*, VRC-PG04); CH103, 44-VRC13.01, 1NC9, 12A12, N6, 1-18, N49-P7, NC-Cow1, IOMA, CH235 and CH235.12, N49P6, N49P7, N49P11, N49P9 and N60P25.~~

~~242. The kit of any one of claims 236 and 239 to 241, further comprising second or additional antigen binding molecules compete with or comprise VH and VL regions from an antibody selected from the group consisting of GS-9723, GS-5423, 3BNC117, VRC07 and VRC07-523.~~

~~243. The kit of any one of claims 236 and 239 to 242, comprising:~~

~~(i) a multi-specific antigen binding molecule comprising an EC domain of CD4 of any one of claims 122 to 127;~~

~~(ii) an antibody or multi-specific antigen binding molecule that competes with or comprises VH and VL regions from an antibody selected from the group consisting of 10-1074, 10-1074-J, GS-9722 (elipovimab), GS-2872, PGT-121, PGT-121.66, PGT-121.414 and PGT-134; and~~

~~(iii) an antibody or multi-specific antigen binding molecule that competes with or comprises VH and VL regions from an antibody selected from the group consisting of GS-9723, GS-5423, 3BNC117, VRC07 and VRC07-523.~~

~~244. The kit of any one of claims 224 to 243, comprising two or more unitary doses, wherein the unitary doses are the same.~~

~~245. The kit of any one of claims 224 to 243, comprising two or more unitary doses, wherein the unitary doses are different.~~

~~246. A method of producing a multi-specific antigen binding molecule, the method comprising:~~

~~a) culturing a cell or population of cells of any one of claims 183 to 190 transformed with the polynucleotide or polynucleotides of any one of claims 151 to 166, or~~

the expression cassette or multiple expression cassettes of claim 168 in a cell culture under conditions sufficient to express the multi-specific antigen binding molecules; and

b) isolating or purifying the antigen binding molecules from the cell culture.

247. The method of claim 246, wherein the first antigen binding domain is a scFv and the second antigen binding domain is a Fab.

248. The method of claim 246, wherein the first antigen binding domain is a Fab and the second antigen binding domain is a Fab or an EC domain of CD4.

249. The method of claim 248, wherein the first antigen binding domain is a Fab and the second antigen binding domain is an EC domain of CD4.

250. The method of any one of claims 247 to 249, wherein the polypeptide comprising the first antigen binding domain and the polypeptide comprising the second antigen binding domain are expressed and assembled in the same cell.

251. The method of any one of claims 246 to 250, wherein the isolating or purifying step comprises Protein A chromatography.

252. The method of any one of claim 251, wherein at least 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98%, 99%, or more, of the multi-specific antigen binding molecules are isolated or purified.

253. The method of any one of any one of claims 251 to 252, wherein the isolating or purifying step further comprises ion exchange chromatography.

254. The method of any one of claims 246 to 253, wherein at least 95%, 96%, 97%, 98%, 99%, or more, of the multi-specific antigen binding molecules are isolated or purified.

255. The method of any one of claims 246 to 254, wherein at least 95%, 96%, 97%, 98%, 99%, or more, of the multi-specific antigen binding molecules isolate or purify as non-aggregated soluble heterodimer as determined using size exclusion chromatography (SEC).

256. The method of any one of claims 246 to 255, wherein the isolated or purified multi-specific antigen binding molecules have increased homogeneity as assessed

by analytical ion exchange chromatography, wherein the integrated area of a main peak representing an unmodified target species is at least 95%, 96%, 97%, 98%, or more, of the sum of all integrated protein peak areas.

257. The method of any one of claims 246 to 256, wherein the isolated or purified antigen binding molecules have fewer than 35%, 30%, 25%, 20%, 15%, 10%, 9%, 8%, 7%, or fewer, acidic contaminants.

258. The method of any one of claims 246 to 257, wherein the cell or population of cells are cultured in a culture volume of at least 2L, *e.g.*, at least 5L, 10L, 50L, 100L, 150L, 200L, 250L, or more.

259. The method of any one of claims 246 to 258, further comprising formulating the antigen binding molecule into a sterile pharmaceutical composition suitable for administration to a human subject.

260. A method of treating or preventing HIV in a human subject in need thereof, the method comprising administering to the subject an effective amount of one or more multi-specific antigen binding molecules of any one of claims 1 to 149, one or more polynucleotides of any one of claims 151 to 166 the lipoplex (*e.g.*, LNP) of claim 167, or the pharmaceutical composition of any one of claims 191 to 223.

261. A method of preventing or treating an HIV infection or an HIV-related disease comprising the steps of: identifying a patient in need of such prevention or treatment, and administering to said patient a first therapeutic agent comprising a therapeutically effective amount of one or more multi-specific antigen binding molecules of any one of claims 1 to 149, one or more polynucleotides of any one of claims 151 to 166 the lipoplex (*e.g.*, LNP) of claim 167, or the pharmaceutical composition of any one of claims 191 to 223.

262. The method of any one of claims 260 to 261, further comprising administering to the subject a second agent for treating an HIV infection.

263. The method of any one of claims 260 to 262, wherein the subject is not receiving antiretroviral therapy (ART) or ART is discontinued prior to administration of the one or more multi-specific antigen binding molecules.

~~264. The method of any one of claims 260 to 262, wherein ART is discontinued after one or more administrations of the one or more multi-specific antigen binding molecules.~~

~~265. The method of any one of claims 260 to 262, further comprising administering one or more antiretroviral therapy (ART) agents to the subject.~~

~~266. The method of any one of claims 260 to 265, further comprising administering to the subject at least one of a TLR agonist and an IL-15 receptor agonist.~~

~~267. The method of claim 266, comprising administering a multi-specific antigen binding molecule of any one of claims 70 to 84 and an IL-15 receptor agonist.~~

~~268. The method of claim 266, wherein the TLR agonist is a TLR2 agonist, a TLR3 agonist, a TLR7 agonist, a TLR8 agonist or a TLR9 agonist.~~

~~269. The method of claim 268, wherein the TLR7 agonist is selected from the group consisting of vesatolimod, imiquimod, and resiquimod.~~

~~270. The method of claim 268, wherein the TLR8 agonist is selected from the group consisting of selgantolimod, motolimod and resiquimod.~~

~~271. The method of claim 268, wherein the TLR9 agonist is selected from the group consisting of cavrotolimod, cobitolimod, agatolimod, leftolimod, litenimod and tilsotolimod.~~

~~272. The method of any one of claims 260 to 269, comprising administering a first multi-specific antigen binding molecule and second or additional antigen binding molecules, wherein the first multi-specific antigen binding molecule and the second or additional antigen binding molecules bind to different epitopes or regions of gp120 selected from the group consisting of:~~

~~(i) third variable loop (V3) (*e.g.*, high mannose patch) comprising a N332 oligomannose glycan;~~

~~(ii) second variable loop (V2) (*e.g.*, Env trimer apex);~~

~~(iii) CD4 binding site (CD4bs);~~

~~(iv) gp120/gp41 interface; or~~

~~(v) silent face of gp120.~~

~~273. The method of claim 272, wherein the first multi-specific antigen binding molecule binds to the third variable loop (V3) (*e.g.*, high mannose patch) comprising a N332 oligomannose glycan and the second antigen binding molecule binds to the CD4 binding site (CD4bs).~~

~~274. The method of any one of claims 272 to 273, wherein the first multi-specific antigen binding molecule competes with or comprises VH and VL regions from an antibody selected from the group consisting of 10-1074, 10-1074-J, GS-9722 (elipovimab), GS-2872, PGT-121, PGT-121.66, PGT-121.414, PGT-122, PGT-123, PGT-124, PGT-125, PGT-126, PGT-128, PGT-130, PGT-133, PGT-134, PGT-135, PGT-136, PGT-137, PGT-138, PGT-139, VRC24, 2G12, BG18, 354BG8, 354BG18, 354BG42, 354BG33, 354BG129, 354BG188, 354BG411, 354BG426, DH270.1, DH270.6, PGDM12, VRC41.01, PGDM21, PCDN-33A, BF520.1 and VRC29.03, and the second antigen binding molecule competes with or comprises VH and VL regions from an antibody selected from the group consisting of GS-9723, GS-5423, 3BNC117, 3BNC60, b12, F105, VRC01, VRC07, VRC07-523, VRC03, VRC06, VRC06b01 VRC08, VRC0801, NIH45-46, PGV04 (*a.k.a.*, VRC-PG04); CH103, 44-VRC13.01, 1NC9, 12A12, N6, 1-18, N49-P7, NC-Cow1, IOMA, CH235 and CH235.12, N49P6, N49P7, N49P11, N49P9 and N60P25.~~

~~275. The method of any one of claims 272 to 274, wherein the first multi-specific antigen binding molecule competes with or comprises VH and VL regions from an antibody selected from the group consisting of 10-1074, 10-1074-J, GS-9722 (elipovimab), GS-2872, PGT-121, PGT-121.66, PGT-121.414 and PGT-134, and the second antigen binding molecule competes with or comprises VH and VL regions from GS-9723, GS-5423, 3BNC117, VRC07 and VRC07-523.~~

~~276. The method of any one of claims 272 to 275, wherein the first multi-specific antigen binding molecule competes with or comprises VH and VL regions from an antibody selected from the group consisting of 10-1074, 10-1074-J, GS-9722 (elipovimab), GS-2872, PGT-121, PGT-121.66, PGT-121.414 and PGT-134, and the second antigen binding molecule comprises an EC domain of CD4.~~

~~277. The method of claim 272, wherein the first multi-specific antigen binding molecule binds to the CD4 binding site (CD4bs) and the second antigen binding molecule binds to the third variable loop (V3) (*e.g.*, high mannose patch) comprising a N332 oligomannose glycan.~~

~~278. The method of any one of claims 272 to 273, wherein the first multi-specific antigen binding molecule competes with or comprises VH and VL regions from an antibody selected from the group consisting of GS-9723, GS-5423, 3BNC117, 3BNC60, b12, F105, VRC01, VRC07, VRC07-523, VRC03, VRC06, VRC06b01 VRC08, VRC0801, NIH45-46, PGV04 (*a.k.a.*, VRC-PG04); CH103, 44-VRC13.01, 1NC9, 12A12, N6, 1-18, N49-P7, NC-Cow1, IOMA, CH235 and CH235.12, N49P6, N49P7, N49P11, N49P9 and N60P25, and the second antigen binding molecule competes with or comprises VH and VL regions from an antibody selected from the group consisting of GS-9722 (elipovimab), GS-2872, PGT-121, PGT-121.66, PGT-121.414, PGT-122, PGT-123, PGT-124, PGT-125, PGT-126, PGT-128, PGT-130, PGT-133, PGT-134, PGT-135, PGT-136, PGT-137, PGT-138, PGT-139, 10-1074, 10-1074-J, VRC24, 2G12, BG18, 354BG8, 354BG18, 354BG42, 354BG33, 354BG129, 354BG188, 354BG411, 354BG426, DH270.1, DH270.6, PGDM12, VRC41.01, PGDM21, PCDN-33A, BF520.1 and VRC29.03.~~

~~279. The method of claim 278, wherein the first multi-specific antigen binding molecule competes with or comprises VH and VL regions from an antibody selected from the group consisting of GS-9723, GS-5423, 3BNC117, VRC07 and VRC07-523, and the second antigen binding molecule competes with or comprises VH and VL regions from 10-1074, 10-1074-J, GS-9722 (elipovimab), GS-2872, PGT-121, PGT-121.66, PGT-121.414 and PGT-134.~~

~~280. The method of claim 277, wherein the first multi-specific antigen binding molecule competes with or comprises an EC domain of CD4, and the second antigen binding molecule competes with or comprises VH and VL regions from an antibody selected from the group consisting of GS-9722 (elipovimab), GS-2872, PGT-121, PGT-121.66, PGT-121.414, PGT-122, PGT-123, PGT-124, PGT-125, PGT-126, PGT-128, PGT-130, PGT-133, PGT-134, PGT-135, PGT-136, PGT-137, PGT-138, PGT-139, 10-1074, 10-1074-J, VRC24, 2G12, BG18, 354BG8, 354BG18, 354BG42, 354BG33, 354BG129, 354BG188, 354BG411, 354BG426, DH270.1, DH270.6, PGDM12, VRC41.01, PGDM21, PCDN-33A, BF520.1 and VRC29.03.~~

~~281. The method of any one of claims 277 and 280, wherein the first multi-specific antigen binding molecule competes with or comprises an EC domain of CD4, and the second antigen binding molecules competes with or comprises VH and VL regions from an antibody selected from the group consisting of 10-1074, 10-1074-J, GS-9722 (elipovimab), GS-2872, PGT-121, PGT-121.66, PGT-121.414 and PGT-134.~~

282. The method of any one of claims 277 and 280 to 281, further comprising an additional antigen binding molecule that competes with or comprises VH and VL regions from an antibody selected from the group consisting of GS-9723, GS-5423, 3BNC117, 3BNC60, b12, F105, VRC01, VRC07, VRC07-523, VRC03, VRC06, VRC06b01 VRC08, VRC0801, NIH45-46, PGV04 (*a.k.a.*, VRC-PG04); CH103, 44-VRC13.01, 1NC9, 12A12, N6, 1-18, N49-P7, NC-Cow1, IOMA, CH235 and CH235.12, N49P6, N49P7, N49P11, N49P9 and N60P25.

283. The method of any one of claims 277 and 280 to 282, further comprising an additional antigen binding molecule that competes with or comprises VH and VL regions from an antibody selected from the group consisting of GS-9723, GS-5423, 3BNC117, VRC07 and VRC07-523.

284. The method of any one of claims 277 and 280 to 283, comprising co-administering:

(i) a multi-specific antigen binding molecule comprising an EC domain of CD4 of any one of claims 122 to 127;

(ii) an antibody or multi-specific antigen binding molecule that competes with or comprises VH and VL regions from an antibody selected from the group consisting of 10-1074, 10-1074-J, GS-9722 (elipovimab), GS-2872, PGT-121, PGT-121.66, PGT-121.414 and PGT-134; and

(iii) an antibody or multi-specific antigen binding molecule that competes with or comprises VH and VL regions from an antibody selected from the group consisting of GS-9723, GS-5423, 3BNC117, VRC07 and VRC07-523.

285. The method of any one of claims 260 to 284, further comprising administering to the human subject an additional antigen binding molecule or antigen binding fragment thereof that at least one of binds, inhibits, and neutralizes HIV or a polynucleotide encoding the additional antigen binding molecule or antigen binding fragment thereof.

286. The method of any one of claims 260 to 285, comprising administering an antibody or multi-specific antigen binding molecule that competes with or comprises VH and VL regions that bind to the gp120 third variable loop (V3) (*e.g.*, high mannose patch) comprising a N332 oligomannose glycan, and wherein the human subject is

infected with an HIV expressing a gp120 comprising the following amino acid residues, wherein the positions and residues are with reference to SEQ ID NO:69:

(i) N332glycan, D325 and T63;

(ii) N332glycan, D325 and L179;

(iii) N332glycan, D325 and T320;

(iv) N332glycan, D325 and H330;

(v) N332glycan, D325, T63 and L179;

(vi) N332glycan, D325, T63 and T320;

(vii) N332glycan, D325, T63 and H330;

(viii) N332glycan, D325, L179 and T320;

(ix) N332glycan, D325, L179 and H330;

(x) N332glycan, D325, T320 and H330;

(xi) N332glycan, D325, T63, T320 and H330;

(xii) N332glycan, D325, T63, L179 and T320;

(xiii) N332glycan, D325, T63, L179 and H330;

(xiv) N332glycan, D325, L179, T320 and H330; or

(xv) N332glycan, D325, T63, L179, T320 and H330.

287. The method of any one of claims 260 to 286, comprising administering an antibody or multi-specific antigen binding molecule that competes with or comprises VH and VL regions that bind to the gp120 CD4 binding site, and wherein the human subject is infected with an HIV expressing a gp120 comprising the following amino acid residues, wherein the positions and residues are with reference to SEQ ID NO:73:

(i) I201 and F353;

(ii) I201, I108 and F353;

(iii) I201, I108, A281 and F353;

(iv) I201, E102, I108, A281 and F353; or

(v) I201, E102, I108, A281, Y318 and F353.

288. The method of any one of claims 260 to 287, comprising multiple administrations of the one or more multi-specific antigen binding molecules, optionally with a TLR agonist or an IL-15 receptor agonist, at predetermined intervals.

289. The method of claim 288, comprising multiple administrations of a multi-specific antigen binding molecule of any one of claims 70 to 84 and an IL-15 receptor

~~agonist, wherein the multi-specific antigen binding molecule and the IL-15 receptor agonist are independently administered at predetermined intervals.~~

~~290. The method or use of any one of claims 260 to 269, wherein the subject is chronically infected with HIV.~~

~~291. The method or use of any one of claims 260 to 290, wherein the one or more multi-specific antigen binding molecules, the polynucleotide, the vector, the LNP and/or the pharmaceutical composition are administered systemically or locally.~~

~~292. The method or use of any one of claims 260 to 291, wherein the one or more multi-specific antigen binding molecules, the polynucleotide, the vector, the LNP and/or the pharmaceutical composition is administered via a route selected from intravenous, subcutaneous, intramuscular, intradermal and mucosal (*e.g.* buccal, intranasal, intrarectal, intravaginal).~~

~~293. The method or use of any one of claims 262 to 292, wherein the one or more multi-specific antigen binding molecules, the polynucleotide, the vector, the LNP and/or the pharmaceutical composition and the one or more additional therapeutic agents are administered by the same routes of administration.~~

~~294. The method or use of any one of claims 262 to 292, wherein the one or more multi-specific antigen binding molecules, the polynucleotide, the vector, the LNP and/or the pharmaceutical composition and the one or more additional therapeutic agents are administered by different routes of administration.~~

~~295. The method or use of any one of claims 262 to 294, wherein the one or more multi-specific antigen binding molecules, the polynucleotide, the vector, the LNP and/or the pharmaceutical composition and the one or more additional therapeutic agents are co-administered according to the same schedule (*e.g.*, co-administered at the same time intervals).~~

~~296. The method or use of any one of claims 262 to 294, wherein the one or more multi-specific antigen binding molecules, the polynucleotide, the vector, the LNP and/or the pharmaceutical composition and the one or more additional therapeutic agents are co-administered according to different schedules (*e.g.*, co-administered at different time intervals).~~

297. The method or use of any one of any one of claims 260 to 296, wherein the one or more multi-specific antigen binding molecules, the polynucleotide, the vector, the LNP and/or the pharmaceutical composition is administered at a dose in the range of from 1 µg/kg to 5 µg/kg, *e.g.*, from 350 µg/kg to 550 µg/kg, *e.g.*, from 0.3 mg/kg to 30 mg/kg, *e.g.*, from 2 mg/kg to 10 mg/kg, *e.g.*, from 1 µg/kg up to 2 µg/kg, 3 µg/kg, 4 µg/kg, 5 µg/kg, 10 µg/kg, 50 µg/kg, 100 µg/kg, 250 µg/kg, 300 µg/kg, 350 µg/kg, 400 µg/kg, 410 µg/kg, 420 µg/kg, 430 µg/kg, 440 µg/kg, 450 µg/kg, 460 µg/kg, 470 µg/kg, 480 µg/kg, 490 µg/kg, 500 µg/kg, 750 µg/kg, 1 mg/kg, 1.5 mg/kg, 2 mg/kg, 2.5 mg/kg, 3 mg/kg, 3.5 mg/kg, 4 mg/kg, 4.5 mg/kg, 5 mg/kg, 6 mg/kg, 7 mg/kg, 8 mg/kg, 9 mg/kg, 10 mg/kg, 15 mg/kg, 20 mg/kg, 25 mg/kg, 30 mg/kg, 35 mg/kg, 40 mg/kg, 45 mg/kg, or 50 mg/kg, body weight per administration.

298. The method or use of any one of claims 260 to 296, wherein the one or more multi-specific antigen binding molecules, the polynucleotide, the vector, the LNP and/or the pharmaceutical composition is administered at a dose in the range of 0.05 mg to 1000 mg per administration, *e.g.,* from 0.05 mg to 150 mg per administration, *e.g.,* from 0.05 mg to 0.35 mg per administration, *e.g.,* from 25 mg to 50 mg per administration, *e.g.,* from 30 mg to 35 mg per administration, *e.g.,* from 10 mg to 1000 mg per administration, *e.g.,* from 50 mg to 1000 mg per administration, *e.g.,* from 100 mg to 700 mg per administration, *e.g.*, at least 0.05 mg up to 0.1 mg, 0.2 mg, 0.3 mg, 0.35 mg, 0.4 mg, 0.5 mg, 0.6 mg, 0.7 mg, 0.8 mg, 1.0 mg, 5 mg, 10 mg, 25 mg, 30 mg, 35 mg, 40 mg, 45 mg, 50 mg, 60 mg, 70 mg, 80 mg, 90 mg, 100 mg, 200 mg, 300 mg, 400 mg, 500 mg, 600 mg, 700 mg, 800 mg, 900 mg, or 1000 mg per administration.

299. The method or use of any one of claims 260 to 298, comprising multiple administrations of the one or more multi-specific antigen binding molecules, the polynucleotide, the vector, the LNP and/or the pharmaceutical composition, optionally with one or more additional therapeutic agents, at predetermined intervals.

300. The method or use of any one of claims 260 to 299, comprising administering over a time period of at least about 2 weeks, 3 weeks, 1 month, 6, weeks, 2 months, 10 weeks, 3 months, 4 months, 5 months, 6 months, 7 months, 8 months, 9 months, 10 months, 11 months, 12 months, 13 months, 14 months, 15 months, 16 months, 17 months, 18 months, 19 months, 20 months, 21 months, 22 months, 23 months, 24 months, or longer.

301. The method or use of any one of claims 260 to 300, comprising administering one or more times at predetermined intervals spaced at least 1 week and up to at least 2 weeks, 3 weeks, 1 month, 2 months, 3 months, 4 months, 5 months or 6 months apart.

302. The method or use of any one of claims 260 to 301, wherein the one or more multi-specific antigen binding molecules, the polynucleotide, the vector, the LNP and/or the pharmaceutical composition is administered once weekly (*i.e.*, QW), once bi-weekly (*i.e.* once every other week, or once every two weeks or Q2W), once thrice-weekly (*i.e.* once every three weeks or Q3W), once monthly (*i.e.*, QM) or once bi-monthly dosing (*i.e.* once every other month, or once every two months or Q2M), once every three months (Q3M), once every four months (Q4M), once every five months (Q5M), once every six months (Q6M), or less often.

303. The method or use of any one of claims 260 to 302, wherein the one or more multi-specific antigen binding molecules, the polynucleotide, the vector, the LNP and/or the pharmaceutical composition is administered two, three, four, five, or more, times intravenously or subcutaneously at an interval or at intervals between once bi-weekly (*i.e.* once every other week, or once every two weeks or Q2W) to once thrice-weekly (*i.e.* once every three weeks or Q3W).

304. The method or use of any one of claims 260 to 303, wherein the one or more multi-specific antigen binding molecules have a serum half-life in a human of at least 3 days, *e.g.*, at least 4 days, at least 5 days, at least 6 days, at least 7 days, at least 8 days, at least 9 days, at least 10 days, at least 11 days, at least 12 days, at least 13 days, at least 14 days, at least 15 days, at least 16 days, or longer.

305. The method or use of any one of claims 260 to 304, wherein the subject or the mammal is a human.

306. The method of any one of claims 260 to 288, wherein the subject does not exhibit symptoms of HIV or AIDS in the absence of anti-retroviral treatment (ART) for at least 6 months, at least 1 year, at least 2 years, at least 3 years, or more.

307. The method of any one of claims 260 to 306, wherein the subject has a viral load of copies/ml blood of less than 500, *e.g.*, less than 400, less than 300, less than 200, less than 100, less than 50, in the absence of anti-retroviral treatment (ART) for at least 6 months, at least 1 year, at least 2 years, at least 3 years, or more.

308. A method of treating or preventing HIV in a human subject in need thereof, the method comprising:

a) Identifying a human subject who is infected with an HIV expressing a gp120 comprising the following amino acid residues, wherein the positions and residues are with reference to SEQ ID NO:69:

(i) N332glycan, D325 and T63;

(ii) N332glycan, D325 and L179;

(iii) N332glycan, D325 and T320;

(iv) N332glycan, D325 and H330;

(v) N332glycan, D325, T63 and L179;

(vi) N332glycan, D325, T63 and T320;

(vii) N332glycan, D325, T63 and H330;

(viii) N332glycan, D325, L179 and T320;

(ix) N332glycan, D325, L179 and H330;

(x) N332glycan, D325, T320 and H330;

(xi) N332glycan, D325, T63, T320 and H330;

(xii) N332glycan, D325, T63, L179 and T320;

(xiii) N332glycan, D325, T63, L179 and H330;

(xiv) N332glycan, D325, L179, T320 and H330; or

(xv) N332glycan, D325, T63, L179, T320 and H330; and

b) Administering to the subject an effective amount of the multi-specific antigen binding molecule of any one of claims 1 to 149, or the pharmaceutical composition of any one of claims 191 to 223, wherein the second binding domain competes with or comprises VH and VL regions that bind to the gp120 third variable loop (V3) (*e.g.*, high mannose patch) comprising a N332 oligomannose glycan.

309. The method of claim 308, comprising identifying a subject infected with an HIV or a population of HIV expressing a gp120 comprising the following amino acid residues:

(i) N332glycan, D325 and T63;

(ii) N332glycan, D325 and L179;

(iii) N332glycan, D325 and T320; or

(iv) N332glycan, D325 and H330.

310. The method of any one of claims 308 to 309, comprising identifying a subject infected with an HIV or a population of HIV expressing a gp120 comprising the following amino acid residues:

(i) N332glycan, D325, T63 and L179;

(ii) N332glycan, D325, T63 and T320;

(iii) N332glycan, D325, T63 and H330;

(iv) N332glycan, D325, L179 and T320;

(v) N332glycan, D325, L179 and H330; or

(vi) N332glycan, D325, T320 and H330.

311. The method of any one of claims 308 to 310, comprising identifying a subject infected with an HIV or a population of HIV expressing a gp120 comprising the following amino acid residues:

(i) N332glycan, D325, L179, T320 and H330;

(ii) N332glycan, D325, T63, T320 and H330;

(iii) N332glycan, D325, T63, L179 and T320; or

(iv) N332glycan, D325, T63, L179 and H330.

312. The method of any one of claims 308 to 311, comprising identifying a subject infected with an HIV or a population of HIV expressing a gp120 comprising the following amino acid residues:

(i) N332glycan, D325, T63 and H330;

(ii) N332glycan, D325, T320 and H330;

(iii) N332glycan, D325, L179, T320 and H330; or

(iv) N332glycan, D325, T63, L179, T320 and H330.

313. The method of any one of claims 308 to 312, wherein the second antigen binding domain competes with or comprises VH and VL regions from an antibody selected from the group consisting of 10-1074, 10-1074-J, GS-9722 (elipovimab), GS-9721, GS-2872, PGT-121, PGT-121.66, PGT-121.414, PGT-122, PGT-123, PGT-124, PGT-125, PGT-126, PGT-128, PGT-130, PGT-133, PGT-134, PGT-135, PGT-136, PGT-137, PGT-138, PGT-139, VRC24, 2G12, BG18, 354BG8, 354BG18, 354BG42, 354BG33, 354BG129, 354BG188, 354BG411, 354BG426, DH270.1, DH270.6, PGDM12, VRC41.01, PGDM21, PCDN-33A, BF520.1 and VRC29.03.

314. The method of any one of claims 308 to 313, wherein the second antigen binding domain competes with or comprises VH and VL regions from an antibody

~~selected from the group consisting of 10-1074, 10-1074-J, GS-9722 (elipovimab), GS-9721, GS-2872, PGT-121, PGT-121.66, PGT-121.414 and PGT-134.~~

~~315. A method of treating or preventing HIV in a human subject in need thereof, the method comprising:~~

~~a) Identifying a human subject who is infected with an HIV expressing a gp120 comprising the following amino acid residues, wherein the positions and residues are with reference to SEQ ID NO: 73:~~

~~(i) I201 and F353;~~

~~(ii) I201, I108 and F353;~~

~~(iii) I201, I108, A281 and F353;~~

~~(iv) I201, E102, I108, A281 and F353; or~~

~~(v) I201, E102, I108, A281, Y318 and F353; and~~

~~b) Administering to the subject an effective amount of the multi-specific antigen binding molecule of any one of claims 1 to 149, or the pharmaceutical composition of any one of claims 191 to 223, wherein the second binding domain competes with or comprises VH and VL regions that bind to the gp120 CD4 binding site (CD4bs).~~

~~316. The method of claim 315, wherein the second antigen binding domain competes with or comprises VH and VL regions from an antibody selected from the group consisting of 3BNC117, GS-9723, GS-5423, 3BNC60, b12, F105, VRC01, VRC07, VRC07-523, VRC03, VRC06, VRC06b01 VRC08, VRC0801, NIH45-46, PGV04 (*a.k.a.*, VRC-PG04); CH103, 44-VRC13.01, 1NC9, 12A12, N6, 1-18, N49-P7, NC-Cow1, IOMA, CH235 and CH235.12, N49P6, N49P7, N49P11, N49P9 and N60P25.~~

~~317. The method of any one of claims 315 to 316, wherein the second antigen binding domain competes with or comprises VH and VL regions from an antibody selected from the group consisting of 3BNC117, GS-9723, GS-5423, 3BNC60, VRC01, VRC07 and VRC07-523.~~

~~318. The method of any one of claims 308 to 317, further comprising administering to the subject a second agent for treating an HIV infection.~~

~~319. The method of any one of claims 308 to 318, wherein the subject is not receiving antiretroviral therapy (ART) or ART is discontinued prior to administration of the one or more multi-specific antigen binding molecules.~~

~~320. The method of any one of claims 308 to 318, wherein ART is discontinued after one or more administrations of the one or more multi-specific antigen binding molecules.~~

~~321. The method of any one of claims 308 to 318, further comprising administering one or more antiretroviral therapy (ART) agents to the subject.~~

~~322. The method of any one of claims 308 to 321, further comprising administering to the subject at least one of a TLR agonist and an IL-15 receptor agonist.~~

~~323. The method of claim 322, comprising administering a multi-specific antigen binding molecule of any one of claims 70 to 84 and an IL-15 receptor agonist.~~

~~324. The method of claim 322, wherein the TLR agonist is a TLR2 agonist, a TLR3 agonist, a TLR7 agonist, a TLR8 agonist or a TLR9 agonist.~~

~~325. The method of claim 324, wherein the TLR7 agonist is selected from the group consisting of vesatolimod, imiquimod, and resiquimod.~~

~~326. The method of any one of claims 308 to 325, comprising multiple administrations of the one or more multi-specific antigen binding molecules, optionally with the TLR agonist, at predetermined intervals.~~

~~327. The method of any one of claims 308 to 326, wherein the subject does not exhibit symptoms of HIV or AIDS in the absence of anti-retroviral treatment (ART) for at least 6 months, at least 1 year, at least 2 years, at least 3 years, or more.~~

~~328. The method of any one of claims 308 to 327, wherein the subject has a viral load copies/ml blood of less than 500, *e.g.*, less than 400, less than 300, less than 200, less than 100, less than 50, in the absence of anti-retroviral treatment (ART) for at least 6 months, at least 1 year, at least 2 years, at least 3 years, or more.~~

~~329. Use of the multi-specific antigen binding molecule or antigen binding fragment thereof of any one of claims 1 to 149, or the pharmaceutical composition of any one of claims 191 to 223 in a method of at least one of treating, preventing and inhibiting HIV in a human subject in need thereof.~~

~~330. The use of claim 329, further comprising administering to the subject a second agent for treating an HIV infection.~~

331. The use of any one of claims 329 to 330, further comprising administering to the subject at least one of a TLR agonist and an IL-15 receptor agonist.

332. The use of claim 331, comprising administering a multi-specific antigen binding molecule of any one of claims 70 to 84 and an IL-15 receptor agonist.

333. The use of claim 331, wherein the TLR agonist is a TLR2 agonist, a TLR3 agonist, a TLR7 agonist, a TLR8 agonist or a TLR9 agonist.

334. The use of claim 333, wherein the TLR7 agonist is selected from the group consisting of vesatolimod, imiquimod, and resiquimod.

335. The use of any one of claims 329 to 334, comprising administering a first multi-specific antigen binding molecule and second or additional antigen binding molecules, wherein the first multi-specific antigen binding molecule and the second or additional antigen binding molecules bind to different first and second epitopes or regions of gp120 selected from the group consisting of:

(i) third variable loop (V3) (*e.g.*, high mannose patch) comprising a N332 oligomannose glycan;

(ii) second variable loop (V2) (*e.g.*, Env trimer apex);

(iii) CD4 binding site (CD4bs);

(iv) gp120/gp41 interface; or

(v) silent face of gp120.

336. The use of claim 335, wherein the first multi-specific antigen binding molecule binds to the third variable loop (V3) (*e.g.*, high mannose patch) comprising a N332 oligomannose glycan, and the second antigen binding molecule binds to the CD4 binding site (CD4bs).

337. The use of any one of claims 335 to 336, wherein the first multi-specific antigen binding molecule competes with or comprises VH and VL regions from an antibody selected from the group consisting of 10-1074, 10-1074-J, GS-9722 (elipovimab), GS-2872, PGT-121, PGT-121.66, PGT-121.414, PGT-122, PGT-123, PGT-124, PGT-125, PGT-126, PGT-128, PGT-130, PGT-133, PGT-134, PGT-135, PGT-136, PGT-137, PGT-138, PGT-139, VRC24, 2G12, BG18, 354BG8, 354BG18, 354BG42, 354BG33, 354BG129, 354BG188, 354BG411, 354BG426, DH270.1, DH270.6, PGDM12, VRC41.01, PGDM21, PCDN-33A, BF520.1 and VRC29.03, and the second antigen binding molecule competes with or comprises VH and VL regions from an antibody selected from the group

~~consisting of b12, F105, VRC01, VRC07, VRC07-523, VRC03, VRC06, VRC06b01 VRC08, VRC0801, NIH45-46, 3BNC117, 3BNC60, PGV04 (*a.k.a.*, VRC-PG04); CH103, 44-VRC13.01, 1NC9, 12A12, N6, 1-18, N49-P7, NC-Cow1, IOMA, CH235 and CH235.12, N49P6, N49P7, N49P11, N49P9 and N60P25.~~

~~338. The use of any one of claims 335 to 337, wherein the first multi-specific antigen binding molecule competes with or comprises VH and VL regions from an antibody selected from the group consisting of 10-1074, 10-1074-J, GS-9722 (elipovimab), GS-2872, PGT-121, PGT-121.66, PGT-121.414 and PGT-134, and the second antigen binding molecule competes with or comprises VH and VL regions from 3BNC117, GS-9723, VRC07 or VRC07-523.~~

~~339. The use of any one of claims 335 to 338, wherein the first multi-specific antigen binding molecule competes with or comprises VH and VL regions from an antibody selected from the group consisting of 10-1074, 10-1074-J, GS-9722 (elipovimab), GS-2872, PGT-121, PGT-121.66, PGT-121.414 and PGT-134, and the second antigen binding molecule comprises an EC domain of CD4.~~

~~340. The use of claim 335, wherein the first multi-specific antigen binding molecule binds to the CD4 binding site (CD4bs) and the second antigen binding molecule binds to the third variable loop (V3) (*e.g.*, high mannose patch) comprising a N332 oligomannose glycan.~~

~~341. The use of claim 335 or 340, wherein the first multi-specific antigen binding molecule competes with or comprises VH and VL regions from an antibody selected from the group consisting of GS-9723, GS-5423, 3BNC117, 3BNC60, b12, F105, VRC01, VRC07, VRC07-523, VRC03, VRC06, VRC06b01 VRC08, VRC0801, NIH45-46, PGV04 (*a.k.a.*, VRC-PG04); CH103, 44-VRC13.01, 1NC9, 12A12, N6, 1-18, N49-P7, NC-Cow1, IOMA, CH235 and CH235.12, N49P6, N49P7, N49P11, N49P9 and N60P25, and the second antigen binding molecule competes with or comprises VH and VL regions from an antibody selected from the group consisting of GS-9722 (elipovimab), GS-2872, PGT-121, PGT-121.66, PGT-121.414, PGT-122, PGT-123, PGT-124, PGT-125, PGT-126, PGT-128, PGT-130, PGT-133, PGT-134, PGT-135, PGT-136, PGT-137, PGT-138, PGT-139, 10-1074, 10-1074-J, VRC24, 2G12, BG18, 354BG8, 354BG18, 354BG42, 354BG33, 354BG129, 354BG188, 354BG411, 354BG426, DH270.1, DH270.6, PGDM12, VRC41.01, PGDM21, PCDN-33A, BF520.1 and VRC29.03.~~

342. The use of any one of claims 335, 340 and 341, wherein the first multi-specific antigen binding molecule competes with or comprises VH and VL regions from an antibody selected from the group consisting of GS-9723, GS-5423, 3BNC117, VRC07 and VRC07-523, and the second antigen binding molecule competes with or comprises VH and VL regions from 10-1074, 10-1074-J, GS-9722 (elipovimab), GS-2872, PGT-121, PGT-121.66, PGT-121.414 and PGT-134.

343. The use of claim 335 or 340, wherein the first multi-specific antigen binding molecule competes with or comprises an EC domain of CD4, and the second antigen binding molecule competes with or comprises VH and VL regions from an antibody selected from the group consisting of GS-9722 (elipovimab), GS-2872, PGT-121, PGT-121.66, PGT-121.414, PGT-122, PGT-123, PGT-124, PGT-125, PGT-126, PGT-128, PGT-130, PGT-133, PGT-134, PGT-135, PGT-136, PGT-137, PGT-138, PGT-139, 10-1074, 10-1074-J, VRC24, 2G12, BG18, 354BG8, 354BG18, 354BG42, 354BG33, 354BG129, 354BG188, 354BG411, 354BG426, DH270.1, DH270.6, PGDM12, VRC41.01, PGDM21, PCDN-33A, BF520.1 and VRC29.03.

344. The use of any one of claims 335, 340 and 343, wherein the first multi-specific antigen binding molecule competes with or comprises an EC domain of CD4, and the second antigen binding molecule competes with or comprises VH and VL regions from an antibody selected from the group consisting of 10-1074, 10-1074-J, GS-9722 (elipovimab), GS-2872, PGT-121, PGT-121.66, PGT-121.414 and PGT-134.

345. The use of any one of claims 335, 340 and 343 to 344, further comprising second antigen binding molecule competes with or comprises VH and VL regions from an antibody selected from the group consisting of GS-9723, GS-5423, 3BNC117, 3BNC60, b12, F105, VRC01, VRC07, VRC07-523, VRC03, VRC06, VRC06b01 VRC08, VRC0801, NIH45-46, PGV04 (*a.k.a.*, VRC-PG04); CH103, 44-VRC13.01, 1NC9, 12A12, N6, 1-18, N49-P7, NC-Cow1, IOMA, CH235 and CH235.12, N49P6, N49P7, N49P11, N49P9 and N60P25.

346. The use of any one of claims 335, 340 and 343 to 345, further comprising second antigen binding molecule competes with or comprises VH and VL regions from an antibody selected from the group consisting of GS-9723, GS-5423, 3BNC117, VRC07 and VRC07-523.

~~347. The use of any one of claims 335, 340 and 343 to 346, comprising co-administering:~~

~~(i) a multi-specific antigen binding molecule of any one of claims 122 to 127;~~

~~(ii) an antibody that competes with or comprises VH and VL regions from an antibody selected from the group consisting of 10-1074, 10-1074-J, GS-9722 (elipovimab), GS-2872, PGT-121, PGT-121.66, PGT-121.414 and PGT-134; and~~

~~(iii) an antibody that competes with or comprises VH and VL regions from an antibody selected from the group consisting of GS-9723, GS-5423, 3BNC117, VRC07 and VRC07-523.~~

~~348. The use of any one of claims 335 to 347, further comprising administering to the human subject an additional antigen binding molecule or antigen binding fragment thereof that at least one of binds, inhibits, and neutralizes HIV or a polynucleotide encoding the additional antigen binding molecule or antigen binding fragment thereof.~~

~~349. The use of any one of claims 329 to 348, where the human subject is infected with an HIV expressing a gp120 comprising the following amino acid residues:~~

~~(i) N332/D325;~~

~~(ii) N332/D325/H330;~~

~~(iii) N332/D325/H330/T320;~~

~~(iv) N332/D325/H330/T63;~~

~~(v) N332/D325/H330/T63/T320; or~~

~~(vi) N332/D325/H330/T63/T320/L179.~~

1. A multi-specific antigen binding molecule that binds to human CD3 and HIV gp120, wherein the antigen binding molecule comprises:

(a) a first antigen binding domain that comprises a first heavy chain variable domain (VH) and a first light chain variable domain (VL), wherein the first antigen binding domain binds to CD3; and

(b) a second antigen binding domain that binds to HIV gp120 comprising one or more extracellular (EC) domain of CD4, wherein the one or more EC domains of CD4 comprise a sequence as set forth below, or a sequence that is at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at

least 96%, at least 97%, at least 98%, or at least 99% identical to a sequence selected from the group consisting of:

(i) KKVVYGKKGDTVELTCTASQKKNIQFHWKNSNQIKILGNQGSFLTKGPSKLNDRV DSRRSLWDQGNFPLIIKNLKPEDSDTYICEVEDQKEEVQLVVVG (SEQ ID NO: 746);

(ii) KKVVYGKKGDTVELTCTASQKKNIQFHWKNSNQIKILGNQGSFLTKGPSKLNDRV DSRRSLWDQGNFPLIIKNLKPEDSDTYICEVEDQKEEVQLVVVGGGGSGKKVVYG KKGDTVELTCTASQKKNIQFHWKNSNQIKILGNQGSFLTKGPSKLNDRVDSRRSL WDQGNFPLIIKNLKPEDSDTYICEVEDQKEEVQLVVVG (SEQ ID NO: 747);

(iii) KKVVLGKKGDTVELTCTASQKKSIQFHWKNSNQIKILGNQGSFLTKGPSKLNDRA DSRRSLWDQGNFPLIIKNLKIEDSDTYICEVEDQKEEVQLLVFG (SEQ ID NO: 748); or

(iv) KKVVLGKKGDTVELTCTASQKKSIQFHWKNSNQIKILGNQGSFLTKGPSKLNDRA DSRRSLWDQGNFPLIIKNLKIEDSDTYICEVEDQKEEVQLLVFGGGGSGKKVVLG KKGDTVELTCTASQKKSIQFHWKNSNQIKILGNQGSFLTKGPSKLNDRADSRRSL WDQGNFPLIIKNLKIEDSDTYICEVEDQKEEVQLLVFG(SEQ ID NO: 749).

2. The multi-specific antigen binding molecule of claim 1, wherein the one or more EC domains of CD4 comprise a sequence as set forth below, or a sequence that is at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to the sequence of SEQ ID NO: 746.

3. The multi-specific antigen binding molecule of claim 1 or 2, wherein the first antigen binding domain comprises:

a) a first VH-complementarity determining region (CDR) 1 (VH-CDR1), a first VH-CDR2, a first VH-CDR3, a first VL-CDR1, a first VL-CDR2 and a first VL-CDR3 comprising the following amino acid sequences, respectively (according to Kabat): SEQ ID NOs: 1, 11, 8, 4, 9 and 10; or SEQ ID NOs: 1, 12, 8, 4, 9 and 10; and

b) a second antigen binding domain comprises one or more EC domains of CD4 comprising an amino acid sequence that comprises or is at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99%, identical to a CD4 EC domain selected from the group consisting of SEQ ID NOs: 746-749.

4. The multi-specific antigen binding molecule of any one of claims 1 to 3, wherein the first antigen binding domain comprises a first VH-CDR1, a first VH-CDR2, a first VH-CDR3, a first VL-CDR1, a first VL-CDR2 and a first VL-CDR3 comprising the following amino acid sequences, respectively (according to Kabat): SEQ ID NOs: 1, 12, 8, 4, 9 and 10; and the second antigen binding domain comprises one or more EC domains of CD4 comprising an amino acid sequence that comprises or is at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99%, identical to a CD4 EC domain selected from the group consisting of SEQ ID NO: 746.

5. The multi-specific antigen binding molecule of any one of claims 1 to 4, wherein the first antigen binding domain comprises a first VH and a first VL comprising the amino acid sequences set forth, respectively, or comprising amino acid sequences that are at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to the amino acid sequences set forth, respectively: SEQ ID NOs: 51 and 56; and the second antigen binding domain comprises one EC domain of CD4 comprising an amino acid sequence that comprises or is at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99%, identical to a CD4 EC domain of SEQ ID NO: 746.

6. The multi-specific antigen binding molecule of claim 5, wherein the first antigen binding domain comprises a first VH and a first VL comprising the amino acid sequences set forth, respectively: SEQ ID NOs: 51 and 56; and the second antigen binding domain comprises one EC domain of CD4 comprising an amino acid sequence of SEQ ID NO: 746.

7. The multi-specific antigen binding molecule of any one of claims 1 to 6, comprising a heterodimeric human IgG1 or IgG4, comprising a first Fc region and a second Fc region, wherein one or both of the first and second Fc regions comprise one or more of the following amino acids at the indicated positions (EU numbering):

(i) Alanine at position 234

(ii) Alanine at position 235; and

(iii) Serine at position 331.

8. The multi-specific antigen binding molecule of any one of claims 1 to 7, comprising a heterodimeric human IgG1 or IgG4, comprising a first Fc region and a

second Fc region, wherein one or both of the first and second Fc regions comprise the following amino acids at the indicated positions (EU numbering):

(i) Tyrosine at position 252, threonine at position 254 and glutamic acid at position 256 (YTE); or

(ii) Leucine at position 428 and serine at position 434 (LS).

9. The multi-specific antigen binding molecule of any one of claims 1 to 8, comprising a heterodimeric human IgG1, comprising a first Fc region and a second Fc region, wherein both of the first and second Fc regions comprise the following amino acids at the indicated positions (EU numbering): Tyrosine at position 252, threonine at position 254 and glutamic acid at position 256 (YTE).

10. The multi-specific antigen binding molecule of any one of claims 1 to 9, comprising a heterodimeric human IgG1 or IgG4, comprising a first Fc region and a second Fc region, comprising the following amino acids at the indicated positions (EU numbering):

(i) the first Fc region comprises a tryptophan at position 366 (T366W); and the second Fc region comprises a serine at position 366 (T366S), an alanine at position 368 (L368A) and a valine at position 407 (Y407V);

(ii) the first Fc region comprises a serine at position 366 (T366S), an alanine at position 368 (L368A) and a valine at position 407 (Y407V); and the second Fc region comprises a tryptophan at position 366 (T366W);

(iii) the first Fc region comprises a cysteine at position 354 (S354C), a tryptophan at position 366 (T366W); and the second Fc region comprises a cysteine at position 349 (Y349C), a serine at position 366 (T366S), an alanine at position 368 (L368A) and a valine at position 407 (Y407V);

(iv) the first Fc region comprises cysteine at position 349 (Y349C), a serine at position 366 (T366S), an alanine at position 368 (L368A) and a valine at position 407 (Y407V); and the second Fc region comprises a cysteine at position 354 (S354C), a tryptophan at position 366 (T366W).

11. The multi-specific antigen binding molecule of any one of claims 1 to 10, comprising a heterodimeric human IgG1, comprising a first Fc region and a second Fc region, comprising the following amino acids at the indicated positions (EU numbering): the first Fc region comprises a serine at position 366 (T366S), an alanine at position 368

(L368A) and a valine at position 407 (Y407V); and the second Fc region comprises a tryptophan at position 366 (T366W).

12. The multi-specific antigen binding molecule of any one of claims 1 to 11, comprising a heterodimeric human IgG1 or IgG4, comprising a first Fc region and a second Fc region, wherein one of the first Fc region or the second Fc region comprise the following amino acids at the indicated positions (EU numbering):

(i) arginine at position 435 (H435R); or

(ii) arginine at position 435 (H435R) and phenylalanine at position 436 (Y436F).

13. The multi-specific antigen binding molecule of any one of claims 1 to 12, comprising a heterodimeric human IgG1 or IgG4, comprising a first Fc region and a second Fc region, comprising the following amino acids at the indicated positions (EU numbering):

(i) the first Fc region comprises an alanine at position 234 (L234), an alanine at position 235 (L235A), a serine at position 331 (P331S) and a tryptophan at position 366 (T366W); and the second Fc region comprises an alanine a position 234 (L234), an alanine at position 235 (L235A), a serine at position 331 (P331S), a serine at position 366 (T366S), an alanine at position 368 (L368A), a valine at position 407 (Y407V), and an arginine at position 435 (H435R);

(ii) the first Fc region comprises an alanine at position 234 (L234), an alanine at position 235 (L235A), a serine at position 331 (P331S) and a tryptophan at position 366 (T366W); and the second Fc region comprises an alanine a position 234 (L234), an alanine at position 235 (L235A), a serine at position 331 (P331S), a serine at position 366 (T366S), an alanine at position 368 (L368A), a valine at position 407 (Y407V), an arginine at position 435 (H435R) and a phenylalanine at position 436 (Y436F);

(iii) the first Fc region comprises an alanine at position 234 (L234), an alanine at position 235 (L235A), a serine at position 331 (P331S), a serine at position 366 (T366S), an alanine at position 368 (L368A), and a valine at position 407 (Y407V); and the second Fc region comprises an alanine at position 234 (L234), an alanine at position 235 (L235A), a serine at position 331 (P331S) and a tryptophan at position 366 (T366W);

(iv) the first Fc region comprises an alanine at position 234 (L234), an alanine at position 235 (L235A), a serine at position 331 (P331S), a tryptophan at position 366 (T366W), a leucine at position 428 (M428L) and a serine at position 434 (N434S); and the second Fc region comprises an alanine a position 234 (L234), an alanine at position 235

(L235A), a serine at position 331 (P331S), a serine at position 366 (T366S), an alanine at position 368 (L368A), a valine at position 407 (Y407V), and an arginine at position 435 (H435R); or

(v) the first Fc region comprises an alanine at position 234 (L234), an alanine at position 235 (L235A), a serine at position 331 (P331S), a tryptophan at position 366 (T366W), a tyrosine at position 252 (M252Y), a threonine at position 254 (S254T) and a glutamic acid at position 256 (T256E); and the second Fc region comprises an alanine a position 234 (L234), an alanine at position 235 (L235A), a serine at position 331 (P331S), a serine at position 366 (T366S), an alanine at position 368 (L368A), a valine at position 407 (Y407V), and an arginine at position 435 (H435R).

14. The multi-specific antigen binding molecule of any one of claims 1 to 13, wherein the first antigen binding domain is a Fab and the second antigen binding domain is a scFv or an EC domain of CD4 wherein the first antigen binding domain comprises a first HC and a LC, and the second antigen binding domain comprises a second HC, the second HC, the first HC and the LC comprising the amino acid sequences set forth, respectively, below, or comprising amino acid sequences that are at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to the amino acid sequences set forth, respectively, below:

1) SEQ ID NOs: 751, 752 and 753;
2) SEQ ID NOs: 754, 752 and 753;
3) SEQ ID NOs: 755, 756 and 753;
4) SEQ ID NOs: 755, 757 and 753;
5) SEQ ID NOs: 758, 757 and 753; or
6) SEQ ID NOs: 759, 756 and 753.

15. The multi-specific antigen binding molecule of any one of claims 1 to 14, wherein the first antigen binding domain is a Fab and the second antigen binding domain is a scFv or an EC domain of CD4 wherein the first antigen binding domain comprises a first HC and a LC, and the second antigen binding domain comprises a second HC, the second HC, the first HC and the LC comprising the amino acid sequences set forth, respectively, below, or comprising amino acid sequences that are at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least

96%, at least 97%, at least 98%, or at least 99% identical to the amino acid sequences set forth, respectively, below:

1) SEQ ID NOs: 751, 752 and 753; or

2) SEQ ID NOs: 755, 756 and 753.

16. The multi-specific antigen binding molecule of any one of claims 1 to 15, wherein the first antigen binding domain is a Fab and the second antigen binding domain is an EC domain of CD4 wherein the first antigen binding domain comprises a first HC and a LC, and the second antigen binding domain comprises a second HC, the second HC, the first HC and the LC comprising amino acid sequences that are at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to the amino acid sequences set forth, respectively: SEQ ID NOs: 751, 752 and 753.

17. The multi-specific antigen binding molecule of any one of claims 1 to 16, wherein the first antigen binding domain is a Fab and the second antigen binding domain is an EC domain of CD4 wherein the first antigen binding domain comprises a first HC and a LC, and the second antigen binding domain comprises a second HC, the second HC, the first HC and the LC comprising the amino acid sequences set forth, respectively: SEQ ID NOs: 751, 752 and 753.

18. The multi-specific antigen binding molecule of any one of claims 1 to 17, wherein the multi-specific antigen binding molecule is a bispecific antigen binding molecule.

19. The multi-specific antigen binding molecule of any one of claims 1 to 18, wherein the first antigen binding domain binds to CD3 with a KD of lower 3.0 nM (*e.g.*, 2.5 nM), and the antigen binding molecule has a serum half-life in a human or cynomolgus monkey of at least 7 days.

20. A polynucleotide or multiple polynucleotides encoding the HC and LC of the first antigen binding domain that is a Fab, and the HC of the second antigen binding domain that is an scFv or an EC domain of CD4, of the multi-specific antigen binding molecule of any one of claims 1 to 18.

21. The polynucleotide or polynucleotides of claim 20, encoding a multi-specific antigen binding molecule of any one of claims 1 to 18, comprising the following polynucleotide sequences, or polynucleotide sequences that are at least 80%, at least 85%,

at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to the polynucleotide sequences set forth, respectively, below:

i. SEQ ID NOs: 995, 996 and 997;

ii. SEQ ID NOs: 998, 999 and 1000;

iii. SEQ ID NOs: 1001, 1002 and 1003;

iv. SEQ ID NOs: 1004, 1005 and 1000;

v. SEQ ID NOs: 1006, 1002 and 997;

vi. SEQ ID NOs: 1007, 1093 and 1000;

vii. SEQ ID NOs: 998, 1008 and 1000;

viii. SEQ ID NOs: 998, 1009 and 1000;

ix. SEQ ID NOs: 1010, 1011 and 1012;

x. SEQ ID NOs: 1013, 1014 and 1015;

xi. SEQ ID NOs: 1016, 1017 and 1012;

xii. SEQ ID NOs: 1018, 1019 and 1012;

xiii. SEQ ID NOs: 1018, 1020 and 1012;

xiv. SEQ ID NOs: 1021, 1022 and 1023; or

xv. SEQ ID NOs: 1024, 1025 and 1023.

22. The polynucleotide or polynucleotides of claim 20 or 21, comprising the following polynucleotide sequences, or polynucleotide sequences that are at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to the polynucleotide sequences set forth, respectively: SEQ ID NOs: 995, 996 and 997.

23. The polynucleotide or polynucleotides of claim 22, comprising the following polynucleotide sequences, respectively: SEQ ID NOs: 995, 996 and 997.

24. The polynucleotide or polynucleotides of claim 20 or 21, comprising the following polynucleotide sequences, or polynucleotide sequences that are at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to the polynucleotide sequences set forth, respectively: SEQ ID NOs: 998, 999 and 1000.

25. The polynucleotide or polynucleotides of claim 24, comprising the following polynucleotide sequences, respectively: SEQ ID NOs: 998, 999 and 1000.

26. The polynucleotide or polynucleotides of any one of claims 20 to 25, wherein the polynucleotide or polynucleotides are comprised of DNA or RNA.

27. The polynucleotide or polynucleotides of any one of claims 20 to 26, wherein the polynucleotide or polynucleotides are comprised of mRNA.

28. An expression cassette or multiple expression cassettes comprising one or more regulatory sequences operably linked to the polynucleotide or polynucleotides of any one of claims 20 to 27.

29. An expression vector or multiple expression vectors comprising one or more regulatory sequences operably linked to the polynucleotide or polynucleotides of any one of claims 20 to 27, or the expression cassette or expression cassettes of claim 28.

30. The expression vector or expression vectors of claim 29, wherein the expression vector or expression vectors comprise a plasmid vector or a viral vector.

31. The expression vector or expression vectors of claim 29 or 30, wherein the expression vector comprises:

(i) a first expression cassette comprising a first polynucleotide encoding an anti-CD3 VL-CL fusion protein;

(ii) a second expression cassette comprising a second polynucleotide encoding an anti-CD3 VH-Fc fusion protein; and

(iii) a third expression cassette comprising a third polynucleotide encoding a CD4 extracellular (EC) domain-Fc fusion protein.

32. The expression vector of claim 31, wherein the anti-CD3 VL-CL fusion protein, the anti-CD3 VH-Fc fusion protein and the CD4 EC domain-Fc fusion protein comprise amino acid sequences set forth, respectively, or comprise amino acid sequences that are at least 80%, at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% identical to the amino acid sequences set forth, respectively: SEQ ID NOs: 753, 752 and 751.

33. The expression vector of claim 32, wherein the anti-CD3 VL-CL fusion protein, the anti-CD3 VH-Fc fusion protein and the CD4 EC domain-Fc fusion protein comprise amino acid sequences set forth, respectively: SEQ ID NOs: 753, 752 and 751.

34. The expression vector of any one of claims 29 to 33, wherein the first, second and third expression cassettes each comprise a promoter of equivalent transcription strength, *e.g.*, a constitutive promoter, *e.g.*, a promoter selected from cytomegalovirus (CMV), SV40, RSV, EF1a, UBC, PGK and CAGG.

35. A cell or population of cells, comprising the polynucleotide or polynucleotides of any one of claims 20 to 27, the expression cassette or multiple expression cassettes of claim 28, or the expression vector or expression vectors of any one of claims 29 to 34.

36. The cell or population of cells of claim 35, wherein the cell or population of cells comprises a eukaryotic cell.

37. A pharmaceutical composition comprising one or more multi-specific antigen binding molecules claimed in any one of claims 1 to 19, and a pharmaceutically acceptable carrier.

38. The pharmaceutical composition of claim 37, wherein the composition comprises an aqueous formulation.

39. The pharmaceutical composition of claim 37 or 38, at a concentration of from 0.1 mg/ml to 150 mg/ml, *e.g.*, 0.1 mg/ml to 100 mg/ml, *e.g.*, 1 mg/ml to 100 mg/ml, *e.g.*, from 5 mg/ml to 60 mg/ml, *e.g.*, from 20 mg/ml to 150 mg/ml, or from 10 mg/ml to 50 mg/ml.

40. The pharmaceutical composition of any one of claims 37 to 39, formulated for intravenous, intramuscular or subcutaneous administration.

41. A kit comprising one or more containers comprising one or more of the multi-specific antigen binding molecules claimed in any one of claims 1 to 19, the polynucleotide or polynucleotides of any one of claims 20 to 27 the expression vector or expression vectors of any one of claims 29 to 34, or the pharmaceutical composition of any one of claims 37 to 40.

42. The kit of claim 41, comprising one or more unitary doses of the one or more multi-specific antigen binding molecules, or the polynucleotide or polynucleotides, in one or more containers.

43. The kit of claim 41 or 42, comprising one or more unitary doses of the one or more multi-specific antigen binding molecules and a second agent for treating an HIV infection in separate containers.

44. The kit of claim 43, further comprising at least one of a toll-like receptor (TLR) agonist and an IL-15 receptor agonist.

45. The kit of claim 44, comprising a TLR7 agonist selected from the group consisting of vesatolimod, imiquimod, and resiquimod.

46. The kit of any one of claims 41 to 45, wherein the first multi-specific antigen binding molecule comprises an EC domain of CD4, and the second or additional antigen binding molecules comprise VH and VL regions from an antibody selected from the group consisting of 10-1074, 10-1074-J, GS-9722 (elipovimab), GS-2872, PGT-121, PGT-121.66, PGT-121.414 and PGT-134.

47. The kit of any one of claims 41 to 46, further comprising second or additional antigen binding molecules comprising VH and VL regions from an antibody selected from the group consisting of GS-9723, GS-5423, 3BNC117, VRC07 and VRC07-523.

48. The kit of any one of claims 41 to 47, comprising:

(i) a multi-specific antigen binding molecule comprising an EC domain of CD4 of any one of claims 1 to 19;

(ii) an antibody or multi-specific antigen binding molecule that comprises VH and VL regions from an antibody selected from the group consisting of 10-1074, 10-1074-J, GS-9722 (elipovimab), GS-2872, PGT-121, PGT-121.66, PGT-121.414 and PGT-134; and

(iii) an antibody or multi-specific antigen binding molecule that comprises VH and VL regions from an antibody selected from the group consisting of GS-9723, GS-5423, 3BNC117, VRC07 and VRC07-523.

49. A method of producing a multi-specific antigen binding molecule, the method comprising:

a) culturing a cell or population of cells of claim 35 or 36 transformed with the polynucleotide or polynucleotides of any one of claims 20 to 27, or the expression

cassette or multiple expression cassettes of claim 28 in a cell culture under conditions sufficient to express the multi-specific antigen binding molecules; and

b) isolating or purifying the antigen binding molecules from the cell culture.

50. Use of the multi-specific antigen binding molecule or antigen binding fragment thereof of any one of claims 1 to 19, one or more polynucleotides of any one of claims 20 to 27, or the pharmaceutical composition of any one of claims 37 to 40 in the manufacture of a medicament for treating or preventing HIV in a human subject in need thereof.

51. The use of claim 50, wherein the medicament further comprises a second agent for treating an HIV infection.

52. The use of claim 50 or 51, wherein the medicament further comprises at least one of a TLR agonist and an IL-15 receptor agonist.

53. The use of any one of claims 50 to 52, wherein the first multi-specific antigen binding molecule comprises an EC domain of CD4, and the second antigen binding molecule comprises VH and VL regions from an antibody selected from the group consisting of 10-1074, 10-1074-J, GS-9722 (elipovimab), GS-2872, PGT-121, PGT-121.66, PGT-121.414 and PGT-134.

54. The use of any one of claims 50 to 53, wherein the medicament further comprises an additional antigen binding molecule that comprises VH and VL regions from an antibody selected from the group consisting of GS-9723, GS-5423, 3BNC117, VRC07 and VRC07-523.

55. The use of claim 50, wherein the medicament comprises:

(i) a multi-specific antigen binding molecule of any one of claims 1 to 19;

(ii) an antibody or multi-specific antigen binding molecule that comprises VH and VL regions from an antibody selected from the group consisting of 10-1074, 10-1074-J, GS-9722 (elipovimab), GS-2872, PGT-121, PGT-121.66, PGT-121.414 and PGT-134; and

(iii) an antibody or multi-specific antigen binding molecule that comprises VH and VL regions from an antibody selected from the

group consisting of GS-9723, GS-5423, 3BNC117, VRC07 and VRC07-523.