

CLAIMS

~~WE CLAIM:~~

1. An isolated protein comprising an antigen binding domain that binds kallikrein related peptidase 2 (hK2), wherein said antigen binding domain binds to an epitope on hK2 having a sequence selected from the group consisting of SEQ ID NO: 111, 112, 113, 114, and 115.
2. The isolated protein of claim 1;
 - a. wherein the antigen binding domain that binds hK2 binds hK2 within epitopes having sequences of KVTEF (SEQ ID NO: 111) and HYRKW (SEQ ID NO: 112);
 - ~~3. The isolated protein of claim 1;~~ b. wherein the antigen binding domain that binds hK2 competes for binding to hK2 with a reference antibody, the reference antibody comprising:
 - ia. the HCDR1, the HCDR2 and the HCDR3 of the VH of SEQ ID NO: 162 and the LCDR1, the LCDR2 and the LCDR3 of the VL of SEQ ID NO: 163; or
 - ii. the HCDR1, the HCDR2 and the HCDR3 of the VH of SEQ ID NO: 137 and the LCDR1, the LCDR2 and the LCDR3 of the VL of SEQ ID NO: 138; or
 - b. ~~the HCDR1, the HCDR2 and the HCDR3 of the VH of SEQ ID NO: 162 and the LCDR1, the LCDR2 and the LCDR3 of the VL of SEQ ID NO: 163; or~~
 - iiie. the HCDR1, the HCDR2 and the HCDR3 of the VH of SEQ ID NO: 164 and the LCDR1, the LCDR2 and the LCDR3 of the VL of SEQ ID NO: 165; or
 - ivd. the HCDR1, the HCDR2 and the HCDR3 of the VH of SEQ ID NO: 166 and the LCDR1, the LCDR2 and the LCDR3 of the VL of SEQ ID NO: 167; or
 - ve. the HCDR1, the HCDR2 and the HCDR3 of the VH of SEQ ID NO: 168 and the LCDR1, the LCDR2 and the LCDR3 of the VL of SEQ ID NO: 169; or
 - vif. the HCDR1, the HCDR2 and the HCDR3 of the VH of SEQ ID NO: 204 and the LCDR1, the LCDR2 and the LCDR3 of the VL of SEQ ID NO: 205; or
 - vii. the HCDR1, the HCDR2 and the HCDR3 of the VH of SEQ ID NO: 166 and the LCDR1, the LCDR2 and the LCDR3 of the VL of SEQ ID NO: 444;
- ~~4. The isolated protein of claim 3;~~ optionally wherein the antigen binding domain that binds hK2 competes for binding to hK2 with a reference antibody, the reference antibody comprising the HCDR1, the HCDR2 and the HCDR3 of the VH of SEQ ID NO: 162 and the LCDR1, the LCDR2 and the LCDR3 of the VL of SEQ ID NO: 163;
- ~~5. The isolated protein of claim 1-4;~~ c. comprising the HCDR1, the HCDR1, the HCDR3, the LCDR1, the LCDR2 and the LCDR3 of
 - i. SEQ ID NOs: 170, 171, 172, 173, 174 and 175, respectively;

- ija. SEQ ID NOs: 141, 142, 143, 144, 145 and 146, respectively;
- ~~b.~~ SEQ ID NOs: 170, 171, 172, 173, 174 and 175, respectively;
- iiie. SEQ ID NOs: 176, 177, 178, 179, 180 and 181, respectively;
- ivd. SEQ ID NOs: 170, 183, 184, 185, 186, and 187, respectively;
- ve. SEQ ID NOs: 188, 189, 190, 191, 192, and 193, respectively;
- vif. SEQ ID NOs: 206, 207, 208, 182, 470, and 209, respectively;
- viig. SEQ ID NOs: 147, 148, 143, 144, 145 and 146, respectively;
- viiih. SEQ ID NOs: 194, 195, 172, 173, 174, and 175, respectively;
- ixi. SEQ ID NOs: 196, 197, 178, 179, 180, and 181, respectively;
- xj. SEQ ID NOs: 198, 199, 184, 185, 186, and 187, respectively;
- xik. SEQ ID NOs: 200, 201, 190, 191, 192, and 193, respectively; or
- xiii. SEQ ID NOs: 216, 217, 218, 182, 470, and 209, respectively;

~~6.~~ ~~The isolated protein of claim 5,~~ optionally comprising the HCDR1, the HCDR1, the HCDR3, the LCDR1, the LCDR2 and the LCDR3 of SEQ ID NOs: 170, 171, 172, 173, 174 and 175, respectively;

~~7.~~ ~~The isolated protein of any one of claims 1-6,~~ d. wherein the antigen binding domain that binds hK2 is a scFv, a (scFv)₂, a Fv, a Fab, a F(ab')₂, a Fd, a dAb or a VHH-

~~8.~~ ~~The isolated protein of claim 7,~~ optionally wherein:

i. the antigen binding domain that binds hK2 is the Fab;

~~9.~~ ~~The isolated protein of claim 7, wherein~~ ii. the antigen binding domain that binds hK2 is the VHH; or;

~~10.~~ ~~The isolated protein of claim 7, wherein~~ iii. the antigen binding domain that binds hK2 is the scFv-

~~11.~~ ~~The isolated protein of claim 10,~~ for example wherein the scFv comprises, from the N- to C-terminus, a VH, a first linker (L1) and a VL (VH-L1-VL) or the VL, the L1 and the VH (VL-L1-VH)-

~~12.~~ ~~The isolated protein of claim 11,~~ optionally wherein the L1 comprises

Aa. about 5-50 amino acids;

Bb. about 5-40 amino acids;

Cc. about 10-30 amino acids; or

Dd. about 10-20 amino acids;

~~13.~~ ~~The isolated protein of claim 12,~~ for example wherein the L1 comprises an amino acid sequence of SEQ ID NOs: 7, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, or 108-

- ~~14. The isolated protein of claim 13, optionally~~ wherein the L1 comprises the amino acid sequence of SEQ ID NO: 7;
- ~~15. The isolated protein of any one of claims 1-14, e.~~ wherein the antigen binding domain that binds hK2 comprises the VH of SEQ ID NO: ~~162, 137, 162,~~ 164, 166, 168 or 204 and the VL of SEQ ID NO: ~~163, 138, 163,~~ 165, 167, 169 or 205.
- ~~16. The isolated protein of claim 15, optionally~~ wherein the antigen binding domain that binds hK2:
- i. comprises:
- A. the VH of SEQ ID NO: 162 and the VL of SEQ ID NO: 163; or
- Ba. the VH of SEQ ID NO: 137 and the VL of SEQ ID NO: 138; or
- ~~b. the VH of SEQ ID NO: 162 and the VL of SEQ ID NO: 163; or~~
- C. the VH of SEQ ID NO: 164 and the VL of SEQ ID NO: 165; or
- D. the VH of SEQ ID NO: 166 and the VL of SEQ ID NO: 167; or
- E. the VH of SEQ ID NO: 168 and the VL of SEQ ID NO: 169; or
- F. the VH of SEQ ID NO: 204 and the VL of SEQ ID NO: 205; or
- G. the VH of SEQ ID NO: 166 and the VL of SEQ ID NO: 444; or;
- ~~17. The isolated protein of claim 15, wherein the antigen binding domain that binds hK2~~ ii. comprises a VH which is at least 80% (e.g. at least 85%, at least 90%, at least 95%, at least 99% or 100%) identical to the VH of SEQ ID NO: 162 and a VL which is at least 80% (e.g. at least 85%, at least 90%, at least 95%, at least 99% or 100%) identical to the VL of SEQ ID NO: 163;
- ~~18. The isolated protein of any one of claims 1-17, f.~~ wherein the antigen binding domain that binds hK2 comprises an amino acid sequence selected from the group consisting of SEQ ID NOs: ~~404, 405,~~ 133, 134, 308, 316, 324, 325, ~~404, 405,~~ 406, 407, 408, and 409; and/or;
- ~~19. The isolated protein of any one of claims 1-17, g.~~ wherein the antigen binding domain that binds hK2 comprises an amino acid sequence at least 80% (e.g. at least 85%, at least 90%, at least 95%, at least 99% or 100%) identical to the amino acid sequence of SEQ ID NO: 404 or 405.
320. An isolated protein comprising an antigen binding domain that binds kallikrein related peptidase 2 (hK2), wherein the antigen binding domain that binds hK2 comprises a heavy chain variable region (VH) of SEQ ID NO: 75 and a light chain variable region (VL) of SEQ ID NO: 74.
- ~~421.~~ The isolated protein of claim ~~320~~;
- a. wherein the antigen binding domain that binds hK2 comprises the VH of SEQ ID NOs: 4, 5, 6, 139, 159 or 161 and the VL of SEQ ID NOs: 1, 2, 3, 140 or 160 with the

proviso that the antigen binding domain that binds hK2 does not comprise both the VH of SEQ ID NO: 5 and the VL of SEQ ID NO: 2;

~~22. The isolated protein of claim 21, b.~~ wherein the antigen binding domain that binds hK2 comprises:

- ~~ia.~~ the VH of SEQ ID NO: 4 and the VL of SEQ ID NO: 1;
- ~~iib.~~ the VH of SEQ ID NO: 4 and the VL of SEQ ID NO: 2;
- ~~iiie.~~ the VH of SEQ ID NO: 4 and the VL of SEQ ID NO: 3;
- ~~ivd.~~ the VH of SEQ ID NO: 4 and the VL of SEQ ID NO: 140;
- ~~ve.~~ the VH of SEQ ID NO: 4 and the VL of SEQ ID NO: 160;
- ~~vif.~~ the VH of SEQ ID NO: 5 and the VL of SEQ ID NO: 1;
- ~~vii g.~~ the VH of SEQ ID NO: 5 and the VL of SEQ ID NO: 3;
- ~~viiih.~~ the VH of SEQ ID NO: 5 and the VL of SEQ ID NO: 140;
- ~~ixi.~~ the VH of SEQ ID NO: 5 and the VL of SEQ ID NO: 160;
- ~~xj.~~ the VH of SEQ ID NO: 6 and the VL of SEQ ID NO: 1;
- ~~xik.~~ the VH of SEQ ID NO: 6 and the VL of SEQ ID NO: 2;
- ~~xii l.~~ the VH of SEQ ID NO: 6 and the VL of SEQ ID NO: 3;
- ~~xiiim.~~ the VH of SEQ ID NO: 6 and the VL of SEQ ID NO: 140;
- ~~xiv n.~~ the VH of SEQ ID NO: 6 and the VL of SEQ ID NO: 160;
- ~~xv o.~~ the VH of SEQ ID NO: 139 and the VL of SEQ ID NO: 1;
- ~~xvi p.~~ the VH of SEQ ID NO: 139 and the VL of SEQ ID NO: 2;
- ~~xvii q.~~ the VH of SEQ ID NO: 139 and the VL of SEQ ID NO: 3;
- ~~xviii r.~~ the VH of SEQ ID NO: 139 and the VL of SEQ ID NO: 140;
- ~~xix s.~~ the VH of SEQ ID NO: 139 and the VL of SEQ ID NO: 160;
- ~~xx t.~~ the VH of SEQ ID NO: 159 and the VL of SEQ ID NO: 1;
- ~~xxi u.~~ the VH of SEQ ID NO: 159 and the VL of SEQ ID NO: 2;
- ~~xxii v.~~ the VH of SEQ ID NO: 159 and the VL of SEQ ID NO: 3;
- ~~xxiii w.~~ the VH of SEQ ID NO: 159 and the VL of SEQ ID NO: 140;
- ~~xxiv x.~~ the VH of SEQ ID NO: 159 and the VL of SEQ ID NO: 160;
- ~~xxv y.~~ the VH of SEQ ID NO: 161 and the VL of SEQ ID NO: 1;
- ~~xxvi z.~~ the VH of SEQ ID NO: 161 and the VL of SEQ ID NO: 2;
- ~~xxvii aa.~~ the VH of SEQ ID NO: 161 and the VL of SEQ ID NO: 3;
- ~~xxviii bb.~~ the VH of SEQ ID NO: 161 and the VL of SEQ ID NO: 140; or
- ~~xxix ee.~~ the VH of SEQ ID NO: 161 and the VL of SEQ ID NO: 160;

~~23. The isolated protein of any one of claims 20-22, c.~~ comprising the HCDR1, the HCDR1, the HCDR3, the LCDR1, the LCDR2 and the LCDR3 of

- ~~ia.~~ SEQ ID NOs: 63, 64, 66, 67, 69 and 71, respectively;

- iib. SEQ ID NOs: 63, 65, 66, 68, 70 and 71, respectively;
 - iiie. SEQ ID NOs: 63, 65, 66, 67, 69 and 71, respectively;
 - ivd. SEQ ID NOs: 72, 73, 66, 67, 69 and 71, respectively; or
 - ve. SEQ ID NOs: 72, 73, 66, 68, 70 and 71, respectively; or
 - vif. SEQ ID NOs: 72, 73, 66, 67, 69 and 71, respectively;
- ~~24. The isolated protein of claim 21, d. _____ wherein the antigen binding domain that binds hK2 is a scFv, a (scFv)₂, a Fv, a Fab, a F(ab')₂, a Fd, a dAb or a VHH.~~
- ~~25. The isolated protein of claim 24, optionally wherein:~~
- ~~i. _____ the antigen binding domain that binds hK2 is the Fab;~~
- ~~26. The isolated protein of claim 24, wherein ii. the antigen binding domain that binds hK2 is the VHH; or;~~
- ~~27. The isolated protein of claim 24, wherein iii. _____ the antigen binding domain that binds hK2 is the scFv.~~
- ~~28. The isolated protein of claim 27, optionally wherein the scFv comprises, from the N- to C-terminus, a VH, a first linker (L1) and a VL (VH-L1-VL) or the VL, the L1 and the VH (VL-L1-VH).~~
- ~~29. The isolated protein of claim 28, for example wherein the L1 comprises~~
- ~~Aa. about 5-50 amino acids;~~
 - ~~Bb. about 5-40 amino acids~~
 - ~~Ce. about 10-30 amino acids;~~
 - ~~Dd. or about 10-20 amino acids.~~
- ~~30. The isolated protein of claim 29, optionally wherein the L1 comprises an amino acid sequence of SEQ ID NOs: 7, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, or 108; and/or;~~
- ~~31. The isolated protein of any one of claims 21-30, e. wherein the antigen binding domain that binds hK2 comprises the amino acid sequence of SEQ ID NOs: 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 135, 136, 318, 319, 320, 321, 322 or 323.~~
- ~~532. The isolated protein of any one of claims 1-4-31, wherein:~~
- ~~a. _____ the isolated protein is a monospecific protein; or;~~
- ~~33. The isolated protein of any one of claims 1-31, wherein b. the isolated protein is a multispecific protein.~~
- ~~34. The isolated protein of claim 33, optionally wherein the multispecific protein is a bispecific protein or;~~
- ~~35. The isolated protein of claim 33 wherein the multispecific protein is a trispecific protein.~~

- ~~636.~~ The multispecific protein of claim ~~5b34 or 35~~ comprising an antigen binding domain that binds an antigen on a lymphocyte.
- ~~37.~~ The multispecific protein of claim ~~36~~, optionally wherein:
- ~~a.~~ the lymphocyte is a T cell.
- ~~38.~~ The multispecific protein of claim ~~37~~, for example wherein the T cell is a CD8⁺ T cell.
- ~~39.~~ The multispecific protein of claim ~~38~~, optionally wherein the lymphocyte is a natural killer (NK) cell; and/or:
- ~~40.~~ The multispecific protein of ~~any one of claims 36~~, wherein ~~b.~~ the antigen on the lymphocyte is CD3, CD3 epsilon (CD3ε), CD8, KI2L4, NKG2E, NKG2D, NKG2F, BTNL3, CD186, BTNL8, PD-1, CD195, or NKG2C.
- ~~41.~~ The multispecific protein of claim ~~40~~, for example wherein the wherein the antigen on the lymphocyte is CD3ε.
- ~~742.~~ The multispecific protein of claim ~~6b44~~, wherein:
- ~~a.~~ the antigen binding domain that binds CD3ε comprises
- ~~i.~~ the HCDR1 of SEQ ID NO: 255, a HCDR2 of SEQ ID NO: 256, a HCDR3 of SEQ ID NO: 257, a LCDR1 of SEQ ID NO: 258, a LCDR2 of SEQ ID NO: 259 and a LCDR3 of SEQ ID NO: 261; or
- ~~ii.~~ the VH of SEQ ID NO: 248 and the VL of SEQ ID NO: 251; or
- ~~iiiia.~~ a heavy chain complementarity determining region 1 (HCDR1) of SEQ ID NO: 116, a HCDR2 of SEQ ID NO: 117, a HCDR3 of SEQ ID NO: 118, a light chain complementarity determining region 1 (LCDR1) of SEQ ID NO: 119, a LCDR2 of SEQ ID NO: 120 and a LCDR3 of SEQ ID NO: 121; or
- ~~ivb.~~ the VH of SEQ ID NO: 122 and the VL of SEQ ID NO: 123;
- ~~43.~~ The multispecific protein of claim ~~41~~, wherein ~~b.~~ the antigen binding domain that binds CD3ε comprises the VH of SEQ ID NO: 248 and the VL of SEQ ID NO: 157.
- ~~44.~~ The multispecific protein of claim ~~43~~, for example wherein the antigen binding domain that binds CD3ε:
- ~~i.~~ comprises
- ~~Aa.~~ a heavy chain complementarity determining region 1 (HCDR1) of SEQ ID NO: 255, a HCDR2 of SEQ ID NO: 256, a HCDR3 of SEQ ID NO: 257, a light chain complementarity determining region 1 (LCDR1) of SEQ ID NO: 258, a LCDR2 of SEQ ID NO: 259 and a LCDR3 of SEQ ID NO: 260; or

- ~~Bb.~~ the HCDR1 of SEQ ID NO: 255, a HCDR2 of SEQ ID NO: 256, a HCDR3 of SEQ ID NO: 257, a LCDR1 of SEQ ID NO: 258, a LCDR2 of SEQ ID NO: 259 and a LCDR3 of SEQ ID NO: 261; or
- C. the VH of SEQ ID NO: 248 and the VL of SEQ ID NO: 251; or
- ~~De.~~ the VH of SEQ ID NO: 248 and the VL of SEQ ID NO: 249; or
- ~~Ee.~~ the VH of SEQ ID NO: 248 and the VL of SEQ ID NO: 250; or
- ~~e.~~ the VH of SEQ ID NO: 248 and the VL of SEQ ID NO: 251; or
- ~~Ff.~~ the VH of SEQ ID NO: 248 and the VL of SEQ ID NO: 252; or
- ~~Gg.~~ the VH of SEQ ID NO: 248 and the VL of SEQ ID NO: 253; or
- ~~Hh.~~ the VH of SEQ ID NO: 248 and the VL of SEQ ID NO: 254; or
45. The multispecific protein of claim 43, wherein the antigen binding domain that binds CD3ε-ii. _____ comprises a HCDR1 of SEQ ID NO: 255, a HCDR2 of SEQ ID NO: 256, a HCDR3 of SEQ ID NO: 257, a LCDR1 of SEQ ID NO: 258, a LCDR2 of SEQ ID NO: 259 and a LCDR3 of SEQ ID NO: 261;
46. ~~_____ The multispecific protein of claim 43 or 45,~~optionally wherein the antigen binding domain that binds CD3ε comprises a VH which is at least 80% (*e.g.* at least 85%, at least 90%, at least 95%, at least 99% or 100%) identical to the VH of SEQ ID NO: 248 and a VL which is at least 80% (*e.g.* at least 85%, at least 90%, at least 95%, at least 99% or 100%) identical to the VL of SEQ ID NO: 251;
47. ~~The multispecific protein of any one of claims 41-46, wherein c. _____ the binding domain that binds hK2 comprises the HCDR1, the HCDR2, the HCDR3, the LCDR1, the LCDR2 and the LCDR3 of~~
- i. SEQ ID Nos: 170, 171, 172, 173, 174 and 175, respectively;
- ija. SEQ ID NOs: 141, 142, 143, 144, 145 and 146, respectively;
- ~~b.~~ ~~SEQ ID Nos: 170, 171, 172, 173, 174 and 175, respectively;~~
- iiie. SEQ ID NO: 176, 177, 178, 179, 180 and 181, respectively;
- ivd. SEQ ID NO: 170, 183, 184, 185, 186 and 187, respectively;
- ve. SEQ ID NO: 188, 189, 190, 191, 192 and 193, respectively;
- vif. SEQ ID NO: 206, 207, 208, 182, 470 and 209, respectively;
- viiig. SEQ ID NOs: 147, 148, 143, 144, 145 and 146, respectively;
- viiih. SEQ ID NO: 194, 195, 172, 173, 174 and 175, respectively;
- ixi. SEQ ID NO: 196, 197, 178, 179, 190 and 181 respectively;
- xj. SEQ ID NO: 198, 199, 184, 185, 186 and 187, respectively;
- xik. SEQ ID NO: 200, 201, 190, 191, 192 and 193 respectively;
- xii. SEQ ID NO: 216, 217, 218, 182, 470, and 209 respectively;

- ~~xiii~~m. SEQ ID NOs: 63, 64, 66, 67, 69 and 71, respectively;
- ~~xiv~~n. SEQ ID NOs: 63, 65, 66, 68, 70 and 71, respectively;
- ~~xv~~o. SEQ ID NOs: 72, 73, 66, 67, 69 and 71, respectively;
- ~~xvi~~p. SEQ ID NOs: 72, 73, 66, 68, 70 and 71, respectively;
- ~~xvii~~q. the VH of SEQ ID NO: 137 and the VL of SEQ ID NO: 138;
- ~~xviii~~r. the VH of SEQ ID NO: 162 and the VL of SEQ ID NO: 163;
- ~~xix~~s. the VH of SEQ ID NO: 164 and the VL of SEQ ID NO: 165;
- ~~xx~~t. the VH of SEQ ID NO: 166 and the VL of SEQ ID NO: 167;
- ~~xxi~~u. the VH of SEQ ID NO: 168 and the VL of SEQ ID NO: 169;
- ~~xxii~~v. the VH of SEQ ID NO: 204 and the VL of SEQ ID NO: 205;
- ~~xxiii~~w. the VH of SEQ ID NO: 166 and the VL of SEQ ID NO: 444;
- ~~xxiv~~x. the VH of SEQ ID NO: 4 and the VL of SEQ ID NO: 3;
- ~~xxv~~y. the VH of SEQ ID NO: 139 and the VL of SEQ ID NO: 140;
- ~~xxvi~~z. the VH of SEQ ID NO: 159 and the VL of SEQ ID NO: 140;
- ~~xxvii~~aa. the VH of SEQ ID NO: 159 and the VL of SEQ ID NO: 160; or
- ~~xxviii~~bb. the VH of SEQ ID NO: 161 and the VL of SEQ ID NO: 160;

48. ~~_____The multispecific protein of claim 47,~~optionally wherein the binding domain that binds hK2 comprises the HCDR1, the HCDR2, the HCDR3, the LCDR1, the LCDR2 and the LCDR3 of SEQ ID Nos: 170, 171, 172, 173, 174 and 175, respectively;
and/or;

49. ~~The multispecific protein of any one of claims 41-48, wherein d. _____~~ the binding domain that binds CD3 comprises

- ~~ia.~~ the HCDR1 of SEQ ID NO: 116, the HCDR2 of SEQ ID NO: 117, the HCDR3 of SEQ ID NO: 118, the LCDR1 of SEQ ID NO: 119, the LCDR2 of SEQ ID NO: 120 and the LCDR3 of SEQ ID NO: 121; or
- ~~ib.~~ the HCDR1 of SEQ ID NO: 255, the HCDR2 of SEQ ID NO: 256, the HCDR3 of SEQ ID NO: 257, the LCDR1 of SEQ ID NO: 258, the LCDR2 of SEQ ID NO: 259 and a LCDR3 of SEQ ID NO: 260; or
- ~~iiie.~~ the HCDR1 of SEQ ID NO: 255, the HCDR2 of SEQ ID NO: 256, the HCDR3 of SEQ ID NO: 257, the LCDR1 of SEQ ID NO: 258, the LCDR2 of SEQ ID NO: 259 and the LCDR3 of SEQ ID NO: 261; or
- ~~ivd.~~ the VH of SEQ ID NO: 248 and the VL of SEQ ID NO: 249; or
- ~~ve.~~ the VH of SEQ ID NO: 248 and the VL of SEQ ID NO: 250; or
- ~~vif.~~ the VH of SEQ ID NO: 248 and the VL of SEQ ID NO: 251; or
- ~~viiig.~~ the VH of SEQ ID NO: 248 and the VL of SEQ ID NO: 252; or
- ~~viiih.~~ the VH of SEQ ID NO: 248 and the VL of SEQ ID NO: 253; or

- ixi. the VH of SEQ ID NO: 248 and the VL of SEQ ID NO: 254; or
- xj. the VH of SEQ ID NO: 122 and the VL of SEQ ID NO: 123.
850. The isolated protein of any one of claims 1-7-49, wherein the protein is conjugated to a half-life extending moiety:-
51. ~~The isolated protein of claim 50, optionally~~ wherein:
- a. the half-life extending moiety is an immunoglobulin (Ig), a fragment of the Ig, an Ig constant region, a fragment of the Ig constant region, a Fc region, transferrin, albumin, an albumin binding domain or polyethylene glycol:-
52. ~~The isolated protein of claim 51, for example~~ wherein the fragment of the Ig constant region comprises a Fc region:-
53. ~~The isolated protein of claim 52, optionally~~ wherein:
- i. the fragment of the Ig constant region comprises a CH2 domain:-
54. ~~The isolated protein of claim 52, wherein~~ ii. the fragment of the Ig constant region comprises a CH3 domain; or:-
55. ~~The isolated protein of claim 52, wherein~~ iii. the fragment of the Ig constant region comprises the CH2 domain and the CH3 domain:-
56. ~~The isolated protein of claim 55, for example~~ wherein the fragment of the Ig constant region comprises at least a portion of a hinge, the CH2 domain and the CH3 domain:-
57. ~~The isolated protein of claim 56, optionally~~ wherein the fragment of the Ig constant region comprises a hinge, the CH2 domain and the CH3 domain:-
58. ~~The isolated protein of any one of claims 50-57, wherein~~ b. the antigen binding domain that binds hK2 is conjugated:
- i. to the N-terminus of the Ig constant region or the fragment of the Ig constant region:-
59. ~~The isolated protein of any one of claims 50-57, wherein the antigen binding domain that binds hK2 is conjugated~~ ii. to the C-terminus of the Ig constant region or the fragment of the Ig constant region; or:-
60. ~~The isolated protein of any one of claims 50-57, wherein the antigen binding domain that binds hK2 is conjugated~~ iii. to the Ig constant region or the fragment of the Ig constant region via a second linker (L2):-
61. ~~The isolated protein of claim 60, optionally~~ wherein the L2 comprises the amino acid sequence of SEQ ID NOs: 7, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, or 108.
962. The isolated protein of ~~any one of claims 851-61~~, wherein:

- a. the Ig constant region or the fragment of the Ig constant region is an IgG1, an IgG2, an IgG3 or an IgG4 isotype;
- ~~63. The isolated protein of claim 62, optionally wherein the Ig constant region or the fragment of the Ig constant region is an IgG1;~~
- ~~64. The isolated protein of any one of claims 51-63, wherein b. the Ig constant region or the fragment of the Ig constant region comprises at least one mutation that results in reduced binding of the protein to a Fcγ receptor (FcγR);~~
- ~~65. The isolated protein of claim 64, optionally wherein:~~
- ~~i. the FcγR is FcγRI, FcγRIIA, FcγRIIB or FcγRIII, or any combination thereof;~~
- ~~and/or~~
- ~~ii. the at least one mutation that results in reduced binding of the protein to the FcγR is selected from the group consisting of F234A/L235A, L234A/L235A, L234A/L235A/D265S, V234A/G237A/ P238S/H268A/V309L/A330S/P331S, F234A/L235A, S228P/F234A/ L235A, N297A, V234A/G237A, K214T/E233P/ L234V/L235A/G236-deleted/A327G/P331A/D365E/L358M, H268Q/V309L/A330S/P331S, S267E/L328F, L234F/L235E/D265A, L234A/L235A/G237A/P238S/H268A/A330S/P331S, S228P/F234A/L235A/G237A/P238S and S228P/F234A/L235A/G236-deleted/G237A/P238S, wherein residue numbering is according to the EU index;~~
- ~~66. The isolated protein of claim 65, for example wherein the mutations that results in reduced binding of the protein to the FcγR are L234A_L235A_D265S;~~
- ~~67. The isolated protein of claim 51-66, wherein c. the Ig constant region or the fragment of the Ig constant region comprises at least one mutation that results in enhanced binding of the protein to the FcγR;~~
- ~~68. The isolated protein of claim 67, optionally wherein:~~
- ~~i. the FcγR is FcγRI, FcγRIIA, FcγRIIB or FcγRIII, or any combination thereof;~~
- ~~and/or~~
- ~~ii. the at least one mutation that results in enhanced binding of the protein to the FcγR is selected from the group consisting of S239D/I332E, S298A/E333A/K334A, F243L/R292P/Y300L, F243L/R292P/Y300L/P396L, F243L/R292P/Y300L/V305I/P396L and G236A/S239D/I332E, wherein residue numbering is according to the EU index;~~
- ~~69. The isolated protein of any one of claims 64-68, wherein the FcγR is FcγRI, FcγRIIA, FcγRIIB or FcγRIII, or any combination thereof.~~

- ~~70. The isolated protein of any one of claims 51-63, wherein d. _____ the Ig constant region of the fragment of the Ig constant region comprises at least one mutation that modulates a half-life of the protein-~~
- ~~71. The isolated protein of claim 70, optionally wherein at least one mutation that modulates the half-life of the protein is selected from the group consisting of H435A, P257I/N434H, D376V/N434H, M252Y/S254T/T256E/H433K/N434F, T308P/N434A and H435R, wherein residue numbering is according to the EU index; and/or-~~
- ~~72. The isolated protein of any one of the claims 51-63, wherein e. _____ the protein comprises at least one mutation in a CH3 domain of the Ig constant region-~~
- ~~73. The isolated protein of claim 72, optionally wherein the at least one mutation in the CH3 domain of the Ig constant region is selected from the group consisting of T350V, L351Y, F405A, Y407V, T366Y, T366W, F405W, T394W, T394S, Y407T, Y407A, T366S/L368A/Y407V, L351Y/F405A/Y407V, T366I/K392M/T394W, F405A/Y407V, T366L/K392M/T394W, L351Y/Y407A, T366A/K409F, L351Y/Y407A, T366V/K409F, T366A/K409F, T350V/L351Y/F405A/Y407V and T350V/T366L/K392L/T394W, wherein residue numbering is according to the EU index-~~
- ~~74. The isolated protein of claim 73, for example wherein:~~
- ~~i. _____ the mutations in the CH3 domain of the Ig constant region are T350V_T366L_K392L_T394W or T350V_L351Y_F405A_Y407V; and/or-~~
- ~~75. The isolated protein of claim 73 or 74, wherein ii. _____ the IgG constant region comprise SEQ ID: 109, 110, 158 or 378-~~
- ~~76. The isolated protein of claim 75, optionally wherein the IgG constant region comprises SEQ ID NO: 109 or 378.~~
1077. The isolated protein:
- a. of any one of claims ~~1-18 or 50-76~~ 1, 2, 8 or 9, comprising
- ia. a heavy chain (HC) of SEQ ID NO: 210 and a light chain (LC) of SEQ ID NO: 221;
- iib. the HC of SEQ ID NO: 211 and the LC of SEQ ID NO: 222;
- iiie. the HC of SEQ ID NO: 212 and the LC of SEQ ID NO: 223;
- ivd. the HC of SEQ ID NO: 213 and the LC of SEQ ID NO: 224; or
- ve. the HC of SEQ ID NO: 219 and the LC of SEQ ID NO: 220; or-
- ~~78. The isolated protein b. _____ of any claims 1-976, comprising a HC which is at least 80% (e.g. at least 85%, at least 90%, at least 95%, at least 99% or 100%) identical to SEQ ID NO: 354 and a LC which is at least 80% (e.g. at least 85%, at least 90%, at least 95%, at least 99% or 100%) identical to SEQ ID NO: 221.~~

1179. An isolated protein comprising an antigen binding domain that binds hK2, wherein the antigen binding domain:
- a. comprises:
 - i. a HCDR1, a HCDR2, a HCDR3, a LCDR1, a LCDR2 and a LCDR3 of SEQ ID NOs: 170, 171, 172, 173, 174 and 175, respectively; and/or
 - ii. a VH of SEQ ID NO: 162 and a VL of SEQ ID NO: 163; and/or
 - iii. a HC of SEQ ID NO: 354 and a LC of SEQ ID NO: 221;
 - b. comprises:
 - ia. a HCDR1, a HCDR2, a HCDR3, a LCDR1, a LCDR2 and a LCDR3 of SEQ ID NOs: 170, 171, 172, 173, 174 and 175, respectively; and/or
 - iib. a VH of SEQ ID NO: 162 and a VL of SEQ ID NO: 163; and/or
 - iiie. a HC of SEQ ID NO: 210 and a LC of SEQ ID NO: 221;
- ~~80. An isolated protein comprising an antigen binding domain that binds hK2, wherein the antigen binding domain comprises:~~
- ~~a. a HCDR1, a HCDR2, a HCDR3, a LCDR1, a LCDR2 and a LCDR3 of SEQ ID NOs: 170, 171, 172, 173, 174 and 175, respectively; and/or~~
 - ~~b. a VH of SEQ ID NO: 162 and a VL of SEQ ID NO: 163; and/or~~
 - ~~c. a HC of SEQ ID NO: 354 and a LC of SEQ ID NO: 221.~~
- ~~81. An isolated protein comprising an antigen binding domain that binds hK2, wherein the antigen binding domain c. comprises~~
- ~~ia. a HCDR1, a HCDR2, a HCDR3, a LCDR1, a LCDR2 and a LCDR3 of SEQ ID NOs: 176, 177, 178, 179, 180 and 181, respectively; and/or~~
 - ~~iib. a VH of SEQ ID NO: 164 and a VL of SEQ ID NO: 165; and/or~~
 - ~~iiie. a HC of SEQ ID NO: 211 and a LC of SEQ ID NO: 222;~~
- ~~82. An isolated protein comprising an antigen binding domain that binds hK2, wherein the antigen binding domain d. comprises~~
- ~~ia. a HCDR1, a HCDR2, a HCDR3, a LCDR1, a LCDR2 and a LCDR3 of SEQ ID NOs: 170, 183, 184, 185, 186 and 187, respectively; and/or~~
 - ~~iib. a VH of SEQ ID NO: 166 and a VL of SEQ ID NO: 167; and/or~~
 - ~~iiie. a HC of SEQ ID NO: 212 and a LC of SEQ ID NO: 223;~~
- ~~83. An isolated protein comprising an antigen binding domain that binds hK2, wherein the antigen binding domain e. comprises~~
- ~~ia. a HCDR1, a HCDR2, a HCDR3, a LCDR1, a LCDR2 and a LCDR3 of SEQ ID NOs: 188, 189, 190, 191, 192, and 193, respectively; and/or~~
 - ~~iib. a VH of SEQ ID NO: 168 and a VL of SEQ ID NO: 169; and/or~~
 - ~~iiie. a HC of SEQ ID NO: 213 and a LC of SEQ ID NO: 224; or;~~

- ~~84. An isolated protein comprising an antigen binding domain that binds hK2, wherein the antigen binding domain f. comprises~~
- ~~ia. a HCDR1, a HCDR2, a HCDR3, a LCDR1, a LCDR2 and a LCDR3 of SEQ ID NOs: 206, 207, 208, 182, 470 and 209, respectively; and/or~~
 - ~~iib. a VH of SEQ ID NO: 204 and a VL of SEQ ID NO: 205; and/or~~
 - ~~iiie. a HC of SEQ ID NO: 219 and a LC of SEQ ID NO: 220.~~
1285. The isolated protein of ~~any one of claims 1179-84~~, wherein:
- a. the protein is a chimeric antigen receptor (CAR);:-
- ~~86. The isolated protein of any one of claims 79-84, wherein b. the isolated protein is a multispecific protein comprising an antigen binding domain that binds CD3ε;-~~
- ~~87. The multispecific protein of claim 86, optionally wherein the antigen binding domain that binds CD3ε;~~
- ~~i. comprises~~
 - Aa. a heavy chain complementarity determining region 1 (HCDR1) of SEQ ID NO: 116, a HCDR2 of SEQ ID NO: 117, a HCDR3 of SEQ ID NO: 118, a light chain complementarity determining region 1 (LCDR1) of SEQ ID NO: 119, a LCDR2 of SEQ ID NO: 120 and a LCDR3 of SEQ ID NO: 121; or
 - Bb. the VH of SEQ ID NO: 122 and the VL of SEQ ID NO: 123;-
- ~~88. The multispecific protein of claim 86 or 87, wherein the antigen binding domain that binds CD3ε ii. comprises the VH of SEQ ID NO: 248 and the VL of SEQ ID NO: 157;-~~
- ~~89. The multispecific protein of claim 86 or 87, wherein the antigen binding domain that binds CD3ε iii. comprises:~~
- Aa. a heavy chain complementarity determining region 1 (HCDR1) of SEQ ID NO: 255, a HCDR2 of SEQ ID NO: 256, a HCDR3 of SEQ ID NO: 257, a light chain complementarity determining region 1 (LCDR1) of SEQ ID NO: 258, a LCDR2 of SEQ ID NO: 259 and a LCDR3 of SEQ ID NO: 260; or
 - Bb. the HCDR1 of SEQ ID NO: 255, a HCDR2 of SEQ ID NO: 256, a HCDR3 of SEQ ID NO: 257, a LCDR1 of SEQ ID NO: 258, a LCDR2 of SEQ ID NO: 259 and a LCDR3 of SEQ ID NO: 261; or
 - Ce. the VH of SEQ ID NO: 248 and the VL of SEQ ID NO: 249; or
 - Dd. the VH of SEQ ID NO: 248 and the VL of SEQ ID NO: 250; or
 - Ee. the VH of SEQ ID NO: 248 and the VL of SEQ ID NO: 251; or

- Ff. the VH of SEQ ID NO: 248 and the VL of SEQ ID NO: 252; or
- Gg. the VH of SEQ ID NO: 248 and the VL of SEQ ID NO: 253; or
- Hh. the VH of SEQ ID NO: 248 and the VL of SEQ ID NO: 254;-
- ~~90. The multispecific protein of claim 86, wherein the antigen binding domain that binds CD3ε-iv. _____ comprises a HCDR1 of SEQ ID NO: 255, a HCDR2 of SEQ ID NO: 256, a HCDR3 of SEQ ID NO: 257, a LCDR1 of SEQ ID NO: 258, a LCDR2 of SEQ ID NO: 259 and a LCDR3 of SEQ ID NO: 261; or-~~
- ~~91. The multispecific protein of claim 86 or 90, wherein the antigen binding domain that binds CD3ε-v. _____ comprises a VH which is at least 80% (e.g. at least 85%, at least 90%, at least 95%, at least 99% or 100%) identical to the VH of SEQ ID NO: 248 and a VL which is at least 80% (e.g. at least 85%, at least 90%, at least 95%, at least 99% or 100%) identical to the VL of SEQ ID NO: 251.~~
1392. The isolated protein of any one of claims ~~1-12-32~~, wherein the protein is a chimeric antigen receptor (CAR)-
- ~~93. The isolated protein of claim 92, optionally:~~
- a. wherein the CAR comprises
- ia. an extracellular domain comprising the antigen binding domain that binds hK2 of any one of claims ~~1-432~~;
- iib. a transmembrane domain; and
- iiie. an intracellular signaling domain optionally comprising at least one co-stimulatory domain;-
- ~~94. The isolated protein of claim 92 or 93, b. _____ wherein the CAR further comprises a CD8a-hinge region; and/or-~~
- ~~95. The isolated protein of any one of claims 92-94, c. _____ wherein~~
- ia. the CD8a-hinge region comprises an amino acid sequence that is at least 90% identical to the amino acid sequence of SEQ ID NO: 25;
- iib. the transmembrane domain comprises an amino acid sequence that is at least 90% identical to the amino acid sequence of SEQ ID NO: 26; and/or
- iiie. the intracellular signaling domain comprises a co-stimulatory domain having an amino acid sequence that is at least 90% identical to the amino acid sequence of SEQ ID NO: 27 and a primary signaling domain having an amino acid sequence that is at least 90% identical to the amino acid sequence of SEQ ID NO: 28.
1496. An isolated anti-hK2/anti-CD3 protein comprising, a first antigen binding domain that binds hK2 and a second antigen binding domain that binds a lymphocyte antigen.
1597. The isolated anti-hK2/anti-CD3 protein of claim 1496, wherein:

- a. the lymphocyte antigen is a T cell antigen.
- ~~98. The isolated anti-hK2/anti-CD3 protein of claim 97, optionally wherein the T cell antigen is a CD8+ T cell antigen.~~
- ~~99. The isolated anti-hK2/anti-CD3 protein of claim 98, for example wherein the lymphocyte antigen is a NK cell antigen.~~
- ~~100. The isolated anti-hK2/anti-CD3 protein of any one of claims 96-99, wherein b. the lymphocyte antigen is CD3, CD3 epsilon (CD3ε), CD8, KI2L4, NKG2E, NKG2D, NKG2F, BTNL3, CD186, BTNL8, PD-1, CD195, or NKG2C.~~
- ~~101. The isolated anti-hK2/anti-CD3 protein of claim 100, optionally wherein the lymphocyte antigen is CD3ε.~~
- ~~102. The isolated anti-hK2/anti-CD3 protein of any one of claims 96-100, wherein c. the first antigen binding domain that binds hK2 and/or the second antigen binding domain that binds the lymphocyte antigen comprise a scFv, a (scFv)₂, a Fv, a Fab, a F(ab')₂, a Fd, a dAb or a VHH.~~
- ~~103. The isolated anti-hK2/anti-CD3 protein of claim 102, optionally wherein:~~
- ~~i. the first antigen binding domain that binds hK2 and/or the second antigen binding domain that binds the lymphocyte antigen comprise the Fab.~~
- ~~104. The isolated anti-hK2/anti-CD3 protein of claim 102, wherein ii. the first antigen binding domain that binds hK2 and/or the second antigen binding domain that binds the lymphocyte antigen comprise the VHH.~~
- ~~105. The isolated anti-hK2/anti-CD3 protein of claim 102, wherein iii. the first antigen binding domain that binds hK2 and/or the second antigen binding domain that binds the lymphocyte antigen comprise the scFv, or.~~
- ~~106. The isolated anti-hK2/anti-CD3 protein of claim 102, wherein iv. the first antigen binding domain that binds hK2 comprises the Fab and the second antigen binding domain that binds the lymphocyte antigen comprises the scFv.~~
- ~~107. The isolated anti-hK2/anti-CD3 protein of claim 105 or 106, optionally wherein the scFv comprises, from the N- to C-terminus, a VH, a first linker (L1) and a VL (VH-L1-VL) or the VL, the L1 and the VH (VL-L1-VH).~~
- ~~108. The isolated anti-hK2/anti-CD3 protein of claim 107, for example wherein the L1 comprises~~
- ~~Aa. about 5-50 amino acids;~~
- ~~Bb. about 5-40 amino acids;~~
- ~~Cc. about 10-30 amino acids; or~~
- ~~Dd. about 10-20 amino acids.~~

- ~~109.~~—The isolated anti-hK2/anti-CD3 protein of claim ~~108~~, optionally wherein the L1 comprises the amino acid sequence of SEQ ID NOs: 7, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, or 108.
- ~~110.~~—The isolated anti-hK2/anti-CD3 protein of claim ~~109~~, for example wherein the L1 comprises the amino acid sequence of SEQ ID NO: 7;
- ~~111.~~ The isolated anti-hK2/anti-CD3 protein of ~~any one of claims 96-110~~, wherein d. the first antigen binding domain that binds hK2 specifically binds to an epitope on hK2 set forth by SEQ ID NO: 111, 112, 113, 114, or 115.
- ~~112.~~ The isolated anti-hK2/anti-CD3 protein of claim ~~111~~, for example wherein:
- i. the first antigen binding domain that binds hK2 specifically binds to an epitope on hK2 set forth by SEQ ID NO: 111 and 112; and/or:
- ~~113.~~—The isolated anti-hK2/anti-CD3 protein of claim ~~111 or 112~~, wherein ii. the first antigen binding domain that binds hK2 specifically binds to a discontinuous epitope of hK2 comprising one or more amino acid sequences selected from the group consisting of SEQ ID NO: 111, 112, 113, 114, and 115; and/or
- ~~114.~~ The isolated anti-hK2/anti-CD3 protein of ~~any one of claims 96-113~~, wherein e. the second antigen binding domain that binds CD3 ϵ specifically binds to an epitope on CD3 ϵ set forth by SEQ ID NO: 341, 448, or 449.
- ~~115.~~ The isolated anti-hK2/anti-CD3 protein of claim ~~114~~, optionally wherein the second antigen binding domain that binds CD3 ϵ specifically binds to a discontinuous epitope on CD3 ϵ comprising one or more amino acid sequences selected from the group consisting of SEQ ID NO: 341, 448, and 449.
- ~~116.~~ The isolated anti-hK2/anti-CD3 protein of claim ~~115~~, for example wherein the second antigen binding domain that binds CD3 ϵ specifically binds to an epitope on CD3 set forth by SEQ ID NO: 341, 448, and 449.
- ~~117.~~ The isolated anti-hK2/anti-CD3 protein of ~~any one of claims 14 or 1596-116~~, wherein the first antigen binding domain that binds hK2:
- a. comprises a HCDR1 of SEQ ID NOs: 170, 63, 72, 141, 147, ~~170~~, 176, 188, 194, 196, 198, 200, 206, or 216, a HCDR2 of SEQ ID NOs: 171, 64, 65, 73, 142, 148, ~~171~~, 177, , 189, 195, 197, 199, 201, 207, or 217, a HCDR3 of SEQ ID NOs: 172, 66, 143, ~~172~~, 178, 184, 190, 208, or 218, a LCDR1 of SEQ ID NOs: 173, 67, 68, 144, ~~173~~, 179, 182, 185 or 191 a LCDR2 of SEQ ID NOs: 174, 69, 70, 145, ~~174~~, 180, 186, 192, or 470 and a LCDR3 of SEQ ID NOs: 175, 71, 146, ~~175~~, 181, 187, 193, or 209.
- ~~118.~~ The isolated anti-hK2/anti-CD3 protein of ~~117~~, optionally wherein the first antigen binding domain that binds hK2:

i. comprises the HCDR1, the HCDR2, the HCDR3, the LCDR1, the LCDR2 and the LCDR3 of

A. SEQ ID Nos: 170, 171, 172, 173, 174 and 175, respectively;

Ba. SEQ ID NOs: 141, 142, 143, 144, 145 and 146, respectively;

~~b. SEQ ID Nos: 170, 171, 172, 173, 174 and 175, respectively;~~

Ce. SEQ ID NO: 176, 177, 178, 179, 180 and 181, respectively;

Dd. SEQ ID NO: 170, 183, 184, 185, 186 and 187, respectively;

Ee. SEQ ID NO: 188, 189, 190, 191, 192 and 193, respectively;

Ff. SEQ ID NO: 206, 207, 208, 182, 470 and 209, respectively;

Gg. SEQ ID NOs: 147, 148, 143, 144, 145 and 146, respectively;

Hh. SEQ ID NO: 194, 195, 172, 173, 174 and 175, respectively;

Ii. SEQ ID NO: 196, 197, 178, 179, 190 and 181 respectively;

Jj. SEQ ID NO: 198, 199, 184, 185, 186 and 187, respectively;

Kk. SEQ ID NO: 200, 201, 190, 191, 192 and 193 respectively; or

Ll. SEQ ID NO: 216, 217, 218, 181, 470, and 209 respectively;

~~119. The isolated anti hK2/anti CD3 protein of 118, wherein the first antigen binding domain that binds hK2~~ ii. comprises the HCDR1, the HCDR2, the HCDR3, the LCDR1, the LCDR2 and the LCDR3 of SEQ ID Nos: 170, 171, 172, 173, 174 and 175, respectively;

~~120. The isolated anti hK2/anti CD3 protein of claim 118, wherein the first antigen binding domain that binds hK2~~ iii. comprises

A. the VH of SEQ ID NO: 162 and the VL of SEQ ID NO: 163;

Ba. the VH of SEQ ID NO: 137 and the VL of SEQ ID NO: 138;

~~b. the VH of SEQ ID NO: 162 and the VL of SEQ ID NO: 163;~~

Ce. the VH of SEQ ID NO: 164 and the VL of SEQ ID NO: 165;

Dd. the VH of SEQ ID NO: 166 and the VL of SEQ ID NO: 167;

Ee. the VH of SEQ ID NO: 168 and the VL of SEQ ID NO: 169;

Ff. the VH of SEQ ID NO: 204 and the VL of SEQ ID NO: 205; or

Gg. the VH of SEQ ID NO: 166 and the VL of SEQ ID NO: 444; or

~~121. The isolated anti hK2/anti CD3 protein of any one of claims 117-119,~~

~~wherein the first antigen binding domain that binds hK2~~ iv. comprises a VH which is at least 80% (e.g. at least 85%, at least 90%, at least 95%, at least 99% or 100%) identical to the VH of SEQ ID NO: 162 and a VL which is at least 80% (e.g. at least 85%, at least 90%, at least 95%, at least 99% or 100%) identical to the VL of SEQ ID NO: 163; or

~~122. The isolated anti-hK2/anti-CD3 protein of any one of claims 96-115, wherein the first antigen-binding domain that binds hK2 b.~~ comprises the VH of SEQ ID NO: 75 and the VL of SEQ ID NO: 74;

~~123. The isolated anti-hK2/anti-CD3 protein of claim 122, optionally~~ wherein the first antigen binding domain that binds hK2;

i. comprises the VH of SEQ ID NOs: 4, 5, 6, 137, 139, 159, or 161 and the VL of SEQ ID NOs: 1, 2, 3, 140, or 160 with the proviso that the antigen binding domain that binds hK2 does not comprise the VH of SEQ ID NO: 5 and the VL of SEQ ID NO: 2;

~~124. The isolated anti-hK2/anti-CD3 protein of claim 123, wherein the first antigen-binding domain that binds hK2 ii.~~ comprises:

Aa. the VH of SEQ ID NO: 4 and the VL of SEQ ID NO: 1;

Bb. the VH of SEQ ID NO: 4 and the VL of SEQ ID NO: 2;

Cc. the VH of SEQ ID NO: 4 and the VL of SEQ ID NO: 3;

Dd. the VH of SEQ ID NO: 4 and the VL of SEQ ID NO: 140;

Ee. the VH of SEQ ID NO: 4 and the VL of SEQ ID NO: 160;

Ff. the VH of SEQ ID NO: 5 and the VL of SEQ ID NO: 1;

Gg. the VH of SEQ ID NO: 5 and the VL of SEQ ID NO: 3;

Hh. the VH of SEQ ID NO: 5 and the VL of SEQ ID NO: 140;

Ii. the VH of SEQ ID NO: 5 and the VL of SEQ ID NO: 160;

Jj. the VH of SEQ ID NO: 6 and the VL of SEQ ID NO: 1;

Kk. the VH of SEQ ID NO: 6 and the VL of SEQ ID NO: 2;

Ll. the VH of SEQ ID NO: 6 and the VL of SEQ ID NO: 3;

Mm. the VH of SEQ ID NO: 6 and the VL of SEQ ID NO: 140;

Nn. the VH of SEQ ID NO: 6 and the VL of SEQ ID NO: 160;

Oo. the VH of SEQ ID NO: 139 and the VL of SEQ ID NO: 1;

Pp. the VH of SEQ ID NO: 139 and the VL of SEQ ID NO: 2;

Qq. the VH of SEQ ID NO: 139 and the VL of SEQ ID NO: 3;

Rr. the VH of SEQ ID NO: 139 and the VL of SEQ ID NO: 140;

Ss. the VH of SEQ ID NO: 139 and the VL of SEQ ID NO: 160;

Tt. the VH of SEQ ID NO: 159 and the VL of SEQ ID NO: 1;

Uu. the VH of SEQ ID NO: 159 and the VL of SEQ ID NO: 2;

Vv. the VH of SEQ ID NO: 159 and the VL of SEQ ID NO: 3;

Ww. the VH of SEQ ID NO: 159 and the VL of SEQ ID NO: 140;

Xx. the VH of SEQ ID NO: 159 and the VL of SEQ ID NO: 160;

Yy. the VH of SEQ ID NO: 161 and the VL of SEQ ID NO: 1;

~~Zz.~~ the VH of SEQ ID NO: 161 and the VL of SEQ ID NO: 2;

~~AAaa.~~ the VH of SEQ ID NO: 161 and the VL of SEQ ID NO: 3;

~~BBbb.~~ the VH of SEQ ID NO: 161 and the VL of SEQ ID NO: 140; or

~~CCee.~~ the VH of SEQ ID NO: 161 and the VL of SEQ ID NO: 160;

~~125.~~ The isolated anti-hK2/anti-CD3 protein of claim 124, wherein the first antigen binding domain that binds hK2-iii. comprises the amino acid sequence of SEQ ID NOs: 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 133, 134, 135, 136, 308, 316, 318, 319, 320, 321, 322, 323, 324, 325, 404, 405, 406, 407, 408, or 409; and/or-

~~126.~~ The isolated protein of claim 124, wherein the first antigen binding domain that binds hK2-iv. comprises an amino acid sequence at least 80% (e.g. at least 85%, at least 90%, at least 95%, at least 99% or 100%) identical to the amino acid sequence of SEQ ID NO: 404 or 405.

~~171~~27. The isolated anti-hK2/anti-CD3 protein of any one of claims ~~14-16~~~~96-125~~, wherein:
a. the second antigen binding domain that binds the lymphocyte antigen comprises a HCDR1 of SEQ ID NOs: 255 or 116, a HCDR2 of SEQ ID NOs: 256, or 117, a HCDR3 of SEQ ID NOs: 257, or 118, a LCDR1 of SEQ ID NOs: 258 or 119 a LCDR2 of SEQ ID NOs: 259, or 120, and a LCDR3 of SEQ ID NOs: ~~261~~, 260, ~~261~~, or 121;

~~128.~~ The isolated anti-hK2/anti-CD3 protein of claim 126, optionally wherein the second antigen binding domain that binds the lymphocyte antigen:

i. comprises a HCDR1 of SEQ ID NO: 255, a HCDR2 of SEQ ID NO: 256, a HCDR3 of SEQ ID NO: 257, a LCDR1 of SEQ ID NO: 258 a LCDR2 of SEQ ID NO: 259, and a LCDR3 of SEQ ID NO: 261;

~~129.~~ The isolated anti-hK2/anti-CD3 protein of claim 126 or 127, wherein the second antigen binding domain that binds the lymphocyte antigen-ii. comprises the VH of SEQ ID NO: 248 and the VL of SEQ ID NO: 157;

~~130.~~ The isolated anti-hK2/anti-CD3 protein of claim 128 or 129, wherein the second antigen binding domain that binds the lymphocyte antigen-iii. comprises

A. the HCDR1 of SEQ ID NO: 255, the HCDR2 of SEQ ID NO: 256, the HCDR3 of SEQ ID NO: 257, the LCDR1 of SEQ ID NO: 258, the LCDR2 of SEQ ID NO: 259 and the LCDR3 of SEQ ID NO: 261;

B. the VH of SEQ ID NO: 248 and the VL of SEQ ID NO: 251;

Ca. the HCDR1 of SEQ ID NO: 255, the HCDR2 of SEQ ID NO: 256, the HCDR3 of SEQ ID NO: 257, the LCDR1 of SEQ ID NO: 258, the LCDR2 of SEQ ID NO: 259 and a LCDR3 of SEQ ID NO: 260;

~~b. the HCDR1 of SEQ ID NO: 255, the HCDR2 of SEQ ID NO: 256, the HCDR3 of SEQ ID NO: 257, the LCDR1 of SEQ ID NO: 258, the LCDR2 of SEQ ID NO: 259 and the LCDR3 of SEQ ID NO: 261;~~

~~Dc. the VH of SEQ ID NO: 248 and the VL of SEQ ID NO: 249;~~

~~Ee. the VH of SEQ ID NO: 248 and the VL of SEQ ID NO: 250;~~

~~e. the VH of SEQ ID NO: 248 and the VL of SEQ ID NO: 251;~~

~~Ff. the VH of SEQ ID NO: 248 and the VL of SEQ ID NO: 252;~~

~~Gg. the VH of SEQ ID NO: 248 and the VL of SEQ ID NO: 253; or~~

~~Hh. the VH of SEQ ID NO: 248 and the VL of SEQ ID NO: 254; and/or-~~

~~131. The isolated anti-hK2/anti-CD3 protein of claim 129, wherein the second antigen binding domain that binds the lymphocyte antigen iv. comprises a VH which is at least 80% (e.g. at least 85%, at least 90%, at least 95%, at least 99% or 100%) identical to the VH of SEQ ID NO: 248 and a VL which is at least 80% (e.g. at least 85%, at least 90%, at least 95%, at least 99% or 100%)~~

~~identical to the VL of SEQ ID NO: 251; or-~~

~~132. The isolated anti-hK2/anti-CD3 protein of any one of claims 96-126, wherein b. the second antigen binding domain that binds the lymphocyte antigen comprises~~

~~ia. the HCDR1 of SEQ ID NO: 116, the HCDR2 of SEQ ID NO: 117, the HCDR3 of SEQ ID NO: 118, the LCDR1 of SEQ ID NO: 119, the LCDR2 of SEQ ID NO: 120 and the LCDR3 of SEQ ID NO: 121; or~~

~~ii. the VH of SEQ ID NO: 122 and the VL of SEQ ID NO: 123;~~

~~133. The isolated anti-hK2/anti-CD3 protein of claim 132, optionally wherein the second antigen binding domain that binds the lymphocyte antigen comprises:~~

~~A. the amino acid sequence of SEQ ID NOs: 331, 328, 329, 330, 331, 332, 333, 334, 335, 336 or 337; and/or-~~

~~134. The isolated anti-hK2/anti-CD3 protein of claim 96-132, wherein the second antigen binding domain that binds the lymphocyte antigen comprises B. an amino acid sequence which is at least 80% (e.g. at least 85%, at least 90%, at least 95%, at least 99% or 100%) identical to the amino acid sequence of SEQ ID NO: 331.~~

~~18135.~~ The isolated anti-hK2/anti-CD3 protein of any one of claims ~~14-17~~96-134, wherein the first antigen binding domain that binds hK2 is conjugated to a first immunoglobulin (Ig) constant region or a fragment of the first Ig constant region and/or the second antigen binding domain that binds the lymphocyte antigen is conjugated to a second immunoglobulin (Ig) constant region or a fragment of the second Ig constant region.

- ~~136. ———~~ ~~To~~optionally wherein the isolated anti-hK2/anti-CD3 protein ~~claim 135~~, further comprising a second linker (L2) between the first antigen binding domain that binds hK2 and the first Ig constant region or the fragment of the first Ig constant region and the second antigen binding domain that binds the lymphocyte antigen and the second Ig constant region or the fragment of the second Ig constant region-
- ~~137. ———~~ ~~The isolated anti-hK2/anti-CD3 protein of claim 136~~, for example wherein the L2 comprises the amino acid sequence of SEQ ID NOs: 7, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107 or 108-
- ~~138. ———~~ ~~The isolated anti-hK2/anti-CD3 protein of claim 137~~, optionally wherein the fragment of the Ig constant region comprises a Fc region-
- ~~139. ———~~ ~~The isolated anti-hK2/anti-CD3 protein of claim 138~~, optionally wherein:
- a. the fragment of the Ig constant region comprises a CH2 domain-
- ~~140. The isolated anti-hK2/anti-CD3 protein of claim 139~~, for example wherein the fragment of the Ig constant region comprises a CH3 domain-
- ~~141. The isolated anti-hK2/anti-CD3 protein of claim 140~~, for example wherein the fragment of the Ig constant region comprises the CH2 domain and the CH3 domain-
- ~~142. The isolated anti-hK2/anti-CD3 protein of claim 141~~, optionally wherein the fragment of the Ig constant region comprises at least portion of a hinge, the CH2 domain and the CH3 domain-
- ~~143. The isolated anti-hK2/anti-CD3 protein of claim 142~~, for example wherein the fragment of the Ig constant region comprises a hinge, the CH2 domain and the CH3 domain; or-
- ~~144. The isolated anti-hK2/anti-CD3 protein of claim 138~~, wherein b. the first Ig constant region or the fragment of the first Ig constant region and the second Ig constant region or the fragment of the second Ig constant region is an IgG1, an IgG2, and IgG3 or an IgG4 isotype.
- ~~19145.~~ The isolated anti-hK2/anti-CD3 protein of claim ~~18b~~144, wherein:
- a. the first Ig constant region or the fragment of the first Ig constant region and the second Ig constant region or the fragment of the second Ig constant region;
- i. is an IgG1; and/or-
- ~~146. ———~~ ~~The isolated anti-hK2/anti-CD3 protein of claim 145~~, wherein the first Ig constant region or the fragment of the first Ig constant region and the second Ig constant region or the fragment of the second Ig constant region ii. comprises at least one mutation that results in reduced binding of the multispecific protein to a FcγR-
- ~~147. ———~~ ~~The isolated anti-hK2/anti-CD3 protein of claim 146~~, optionally wherein:

A. wherein the FcγR is FcγRI, FcγRIIA, FcγRIIB or FcγRIII, or any combination thereof; and/or

B. the at least one mutation that results in reduced binding of the multispecific protein to the FcγR is selected from the group consisting of F234A/L235A, L234A/L235A, L234A/L235A/D265S, V234A/G237A/P238S/H268A/V309L/A330S/P331S, F234A/L235A, S228P/F234A/L235A, N297A, V234A/G237A, K214T/E233P/L234V/L235A/G236-deleted/A327G/P331A/D365E/L358M, H268Q/V309L/A330S/P331S, S267E/L328F, L234F/L235E/D265A, L234A/L235A/G237A/P238S/H268A/A330S/P331S, S228P/F234A/L235A/G237A/P238S and S228P/F234A/L235A/G236-deleted/G237A/P238S, wherein residue numbering is according to the EU index-

~~148. The isolated anti-hK2/anti-CD3 protein of claim 147, for example wherein mutations that results in reduced binding of the multispecific protein to the FcγR are L234A_L235A_D265S;-~~

~~149. The isolated anti-hK2/anti-CD3 protein of claim 144 wherein b. the first Ig constant region or the fragment of the first Ig constant region and the second Ig constant region or the fragment of the second Ig constant region comprises at least one mutation that results in enhanced binding of the multispecific protein to a Fcγ receptor (FcγR)-~~

~~150. The isolated anti-hK2/anti-CD3 protein of claim 149, optionally wherein:~~

~~i. wherein the FcγR is FcγRI, FcγRIIA, FcγRIIB or FcγRIII, or any combination thereof; and/or~~

~~ii. the at least one mutation that results in enhanced binding of the multispecific protein to the FcγR is selected from the group consisting of S239D/I332E, S298A/E333A/K334A, F243L/R292P/Y300L, F243L/R292P/Y300L/P396L, F243L/R292P/Y300L/V305I/P396L and G236A/S239D/I332E, wherein residue numbering is according to the EU index; or-~~

~~151. The isolated anti-hK2/anti-CD3 protein of any one of claims 146-150, wherein the FcγR is FcγRI, FcγRIIA, FcγRIIB or FcγRIII, or any combination thereof.~~

~~152. The isolated multispecific protein of claim 144, wherein c. the first Ig constant region or the fragment of the first Ig constant region and the second Ig constant region or the fragment of the second Ig constant region comprises at least one mutation that modulates a half-life of the multispecific protein-~~

~~153. The isolated anti-hK2/anti-CD3 protein of claim 152, optionally wherein:~~

i. the at least one mutation that modulates the half-life of the multispecific protein is selected from the group consisting of H435A, P257I/N434H, D376V/N434H, M252Y/S254T/T256E/H433K/N434F, T308P/N434A and H435R, wherein residue numbering is according to the EU index; and/or-

~~154. —~~ Tii. the isolated anti-hK2/anti-CD3 protein of any one of the claims 152 or 153, comprising at least one mutation in a CH3 domain of the first Ig constant region or in a CH3 domain of the fragment of the first Ig constant region and/or at least one mutation in a CH3 domain of the second Ig constant region or in a CH3 domain of the fragment of the second Ig constant region-

~~155. —~~ The isolated anti-hK2/anti-CD3 protein of claim 154, for example wherein the at least one mutation in a CH3 domain of the first Ig constant region or in a CH3 domain of the fragment of the first Ig constant region and/or at least one mutation in a CH3 domain of the second Ig constant region or in a CH3 domain of the fragment of the second Ig constant region is selected from the group consisting of T350V, L351Y, F405A, Y407V, T366Y, T366W, F405W, T394W, T394S, Y407T, Y407A, T366S/L368A/Y407V, L351Y/F405A/Y407V, T366I/K392M/T394W, F405A/Y407V, T366L/K392M/T394W, L351Y/Y407A, T366A/K409F, L351Y/Y407A, T366V/K409F, T366A/K409F, T350V/L351Y/F405A/Y407V and T350V/T366L/K392L/T394W, wherein residue numbering is according to the EU index-

~~156. —~~ The isolated anti-hK2/anti-CD3 protein of claim 155, optionally wherein the mutations in a CH3 domain of the first Ig constant region or in a CH3 domain of the fragment of the first Ig constant region and the mutations in a CH3 domain of the second Ig constant region or in a CH3 domain of the fragment of the second Ig constant region are T350V_T366L_K392L_T394W or T350V_L351Y_F405A_Y407V, respectively.

~~20157.~~ The isolated anti-hK2/anti-CD3 protein of any one of claims 18 or 19135-156, wherein:

a. the first Ig constant region or the fragment of the first Ig constant region and the second Ig constant region or the fragment of the second Ig constant region comprise the following mutations

ia. L234A_L235A_D265S_T350V_L351Y_F405A_Y407V in the first Ig constant region and L234A_L235A_D265S_T350V_T366L_K392L_T394W in the second Ig constant region; or

- iib. L234A_L235A_D265S_T350V_T366L_K392L_T394W in the first Ig constant region and L234A_L235A_D265S_T350V_L351Y_F405A_Y407V in the second Ig constant region;
- ~~158.~~ The isolated anti-hK2/anti-CD3 protein of claim 157, optionally wherein:
- A. the first Ig constant region has a SEQ ID NO: 110 or SEQ ID NO: 378; and/or:
- ~~159.~~ The isolated anti-hK2/anti-CD3 protein of ~~any one of claims 157 or 158,~~ wherein B. the second Ig constant region has a SEQ ID NO: 109 and SEQ ID NO: 158; and/or:
- ~~160.~~ The isolated anti-hK2/anti-CD3 protein of ~~any one of claims 135-157,~~ wherein b. the first Ig constant region comprises an amino acid sequence which is at least 80% (e.g. at least 85%, at least 90%, at least 95%, at least 99% or 100%) identical to SEQ ID NO: 378 and the second Ig constant region comprises an amino acid sequence which is at least 80% (e.g. at least 85%, at least 90%, at least 95%, at least 99% or 100%) identical to SEQ ID NO: 109;
- ~~161.~~ The isolated anti-hK2/anti-CD3 protein of claim 160, optionally wherein the isolated protein further comprises a light chain constant region comprising an amino acid sequence which is at least 80% (e.g. at least 85%, at least 90%, at least 95%, at least 99% or 100%) identical to SEQ ID NO: 309.
- 21~~162.~~ An isolated anti-hK2/anti-CD3 protein comprising a first domain that binds hK2 and a second domain that binds CD3;
- a. wherein
- i. the first binding domain that binds hK2 comprises a HCDR1, a HCDR2, a HCDR3, a LCDR1, a LCDR2 and a LCDR3 of SEQ ID NOs: 170, 171, 172, 173, 174 and 175, respectively, and the second domain that binds the lymphocyte antigen comprises the HCDR1, the HCDR2, the HCDR3, the LCDR1, the LCDR2 and the LCDR3 of SEQ ID NOs: 255, 256, 257, 258, 259 and 261, respectively;
- ii. the first binding domain that binds hK2 comprises a VH of SEQ ID NO: 162 and the VL of SEQ ID NO: 163, and the second binding domain that binds the lymphocyte antigen comprises a scFv of SEQ ID NO: 331; and/or
- iii. the isolated multispecific protein comprises a HC1 of SEQ ID NO: 354, a LC1 of SEQ ID NO: 221 and a HC2 of SEQ ID NO: 360, optionally wherein the isolated multispecific protein comprises a lysine (e.g. K477) at the C-terminus of HC1 and HC2, and wherein the the isolated multispecific protein comprises a HC1 which comprises is at least 80% (e.g. at least 85%, at least 90%, at

least 95%, at least 99% or 100%) identical to the HC1 of SEQ ID NO: 361 and a HC2 which is at least 80% (e.g. at least 85%, at least 90%, at least 95%, at least 99% or 100%) identical to the HC2 of SEQ ID NO: 362;

b. wherein

- ia. the first binding domain that binds hK2 comprises a HCDR1, a HCDR2, a HCDR3, a LCDR1, a LCDR2 and a LCDR3 of SEQ ID NOs: 63, 65, 66, 67, 69 and 71, respectively, and the second domain that binds the lymphocyte antigen comprises the HCDR1, the HCDR2, the HCDR3, the LCDR1, the LCDR2 and the LCDR3 of SEQ ID NOs: 255, 256, 275, 258, 259 and 261, respectively;
- iib. the first binding domain that binds hK2 comprises a scFv of SEQ ID NO: 136, and the second binding domain that binds the lymphocyte antigen comprises the VH of SEQ ID NO: 248 and the VL of SEQ ID NO: 251; and/or
- iiie. the isolated multispecific protein comprises a HC1 of SEQ ID NO: 351, a HC2 of SEQ ID NO: 358 and a LC2 of SEQ ID NO: 267;

~~163. An isolated anti-hK2/anti-CD3 protein comprising a first domain that binds hK2 and a second domain that binds CD3, c. wherein~~

- ia. the first binding domain that binds hK2 comprises a HCDR1, a HCDR2, a HCDR3, a LCDR1, a LCDR2 and a LCDR3 of SEQ ID NOs: 63, 65, 66, 67, 69 and 71, respectively, and the second domain that binds the lymphocyte antigen comprises the HCDR1, the HCDR2, the HCDR3, the LCDR1, the LCDR2 and the LCDR3 of SEQ ID NOs: 116, 117, 118, 119, 120 and 121, respectively;
- iib. the first binding domain that binds hK2 comprises a scFv of SEQ ID NO: 136, and the second binding domain that binds the lymphocyte antigen comprises the VH of SEQ ID NO: 122 and the VL of SEQ ID NO: 123; and/or
- iiie. the isolated multispecific protein comprises a HC1 of SEQ ID NO: 351, a HC2 of SEQ ID NO: 359 and a LC2 of SEQ ID NO: 272;

~~164. An isolated anti-hK2/anti-CD3 protein comprising a first domain that binds hK2 and a second domain that binds CD3, d. wherein~~

- ia. the first binding domain that binds hK2 comprises a HCDR1, a HCDR2, a HCDR3, a LCDR1, a LCDR2 and a LCDR3 of SEQ ID NOs: 141, 142, 143, 144, 145 and 146, respectively, and the second domain that binds the lymphocyte antigen comprises the HCDR1, the HCDR2, the HCDR3, the LCDR1, the LCDR2 and the LCDR3 of SEQ ID NOs: 255, 256, 257, 258, 259 and 261, respectively;

- ii**b**. the first binding domain that binds hK2 comprises a scFv of SEQ ID NO: 134, and the second binding domain that binds the lymphocyte antigen comprises the VH of SEQ ID NO: 248 and the VL of SEQ ID NO: 251; and/or
 - iii**e**. the isolated multispecific protein comprises a HC1 of SEQ ID NO: 352, a HC2 of SEQ ID NO: 358 and a LC2 of SEQ ID NO: 267;_{:-}
- ~~165. An isolated anti-hK2/anti-CD3 protein comprising a first domain that binds hK2 and a second domain that binds CD3, e. wherein~~
 - ia. the first binding domain that binds hK2 comprises a HCDR1, a HCDR2, a HCDR3, a LCDR1, a LCDR2 and a LCDR3 of SEQ ID NOs: 141, 142, 143, 144, 145 and 146, respectively, and the second domain that binds the lymphocyte antigen comprises the HCDR1, the HCDR2, the HCDR3, the LCDR1, the LCDR2 and the LCDR3 of SEQ ID NOs: 116, 117, 118, 119, 120 and 121, respectively;
 - ii**b**. the first binding domain that binds hK2 comprises a scFv of SEQ ID NO: 134, and the second binding domain that binds the lymphocyte antigen comprises the VH of SEQ ID NO: 122 and the VL of SEQ ID NO: 123; and/or
 - iii**e**. the isolated multispecific protein comprises a HC1 of SEQ ID NO: 352, a HC2 of SEQ ID NO: 359 and a LC2 of SEQ ID NO: 272;_{:-}
- ~~166. An isolated anti-hK2/anti-CD3 protein comprising a first domain that binds hK2 and a second domain that binds CD3, f. wherein~~
 - ia. the first binding domain that binds hK2 comprises a HCDR1, a HCDR2, a HCDR3, a LCDR1, a LCDR2 and a LCDR3 of SEQ ID NOs: 188, 189, 190, 191, 192 and 193, respectively, and the second domain that binds the lymphocyte antigen comprises the HCDR1, the HCDR2, the HCDR3, the LCDR1, the LCDR2 and the LCDR3 of SEQ ID NOs: 255, 256, 257, 258, 259 and 261, respectively;
 - ii**b**. the first binding domain that binds hK2 comprises a scFv of SEQ ID NO: 325, and the second binding domain that binds the lymphocyte antigen comprises the VH of SEQ ID NO: 248 and the VL of SEQ ID NO: 251; and/or
 - iii**e**. the isolated multispecific protein comprises a HC1 of SEQ ID NO: 353, a HC2 of SEQ ID NO: 358 and a LC2 of SEQ ID NO: 267;_{:-}
- ~~167. An isolated anti-hK2/anti-CD3 protein comprising a first domain that binds hK2 and a second domain that binds CD3, wherein~~
 - a. ~~the first binding domain that binds hK2 comprises a HCDR1, a HCDR2, a HCDR3, a LCDR1, a LCDR2 and a LCDR3 of SEQ ID NOs: 170, 171, 172, 173, 174 and 175, respectively, and the second domain that binds the lymphocyte antigen comprises the~~

- HCDR1, the HCDR2, the HCDR3, the LCDR1, the LCDR2 and the LCDR3 of SEQ ID NOs: 255, 256, 257, 258, 259 and 261, respectively;
- b. ~~the first binding domain that binds hK2 comprises a VH of SEQ ID NO: 162 and the VL of SEQ ID NO: 163, and the second binding domain that binds the lymphocyte antigen comprises a scFv of SEQ ID NO: 331; and/or~~
- c. ~~the isolated multispecific protein comprises a HC1 of SEQ ID NO: 354, a LC1 of SEQ ID NO: 221 and a HC2 of SEQ ID NO: 360.~~
168. ~~An isolated anti-hK2/anti-CD3 protein comprising a first domain that binds hK2 and a second domain that binds CD3, g. wherein~~
- ia. the first binding domain that binds hK2 comprises a HCDR1, a HCDR2, a HCDR3, a LCDR1, a LCDR2 and a LCDR3 of SEQ ID NOs: 170, 171, 172, 173, 174 and 175, respectively, and the second domain that binds the lymphocyte antigen comprises the HCDR1, the HCDR2, the HCDR3, the LCDR1, the LCDR2 and the LCDR3 of SEQ ID NOs: 255, 256, 257, 258, 259 and 261, respectively;
- ii.b. the first binding domain that binds hK2 comprises a VH which is at least 80% (e.g. at least 85%, at least 90%, at least 95%, at least 99% or 100%) identical to the VH of SEQ ID NO: 162 and a VL which is at least 80% (e.g. at least 85%, at least 90%, at least 95%, at least 99% or 100%) identical to the VL of SEQ ID NO: 163, and the second binding domain that binds the lymphocyte antigen comprises a scFv which is at least 80% (e.g. at least 85%, at least 90%, at least 95%, at least 99% or 100%) identical to the scFv of SEQ ID NO: 331; and/or
- iiie. the isolated multispecific protein comprises a HC1 which is at least 80% (e.g. at least 85%, at least 90%, at least 95%, at least 99% or 100%) identical to the HC1 of SEQ ID NO: 354, a LC1 which is at least 80% (e.g. at least 85%, at least 90%, at least 95%, at least 99% or 100%) identical to the LC1 of SEQ ID NO: 221 and a HC2 which is at least 80% (e.g. at least 85%, at least 90%, at least 95%, at least 99% or 100%) identical to the HC2 of SEQ ID NO: 360;₁₇
169. ~~The isolated anti-hK2/anti-CD3 protein of claim 167 or 168, optionally~~ wherein the isolated multispecific protein comprises a lysine (e.g. K477) at the C-terminus of HC1 and HC2, and wherein the the isolated multispecific protein comprises a HC1 which comprises is at least 80% (e.g. at least 85%, at least 90%, at least 95%, at least 99% or 100%) identical to the HC1 of SEQ ID NO: 361 and a HC2 which is at least 80% (e.g. at least 85%, at least 90%, at least 95%, at least 99% or 100%) identical to the HC2 of SEQ ID NO: 362;₁₇

~~170. An isolated anti-hK2/anti-CD3 protein comprising a first domain that binds hK2 and a second domain that binds CD3, h. wherein~~

- ~~ia.~~ the first binding domain that binds hK2 comprises a HCDR1, a HCDR2, a HCDR3, a LCDR1, a LCDR2 and a LCDR3 of SEQ ID NOs: 170, 183, 184, 185, 186 and 187, respectively, and the second domain that binds the lymphocyte antigen comprises the HCDR1, the HCDR2, the HCDR3, the LCDR1, the LCDR2 and the LCDR3 of SEQ ID NOs: 255, 256, 257, 258, 259 and 261, respectively;
- ~~iib.~~ the first binding domain that binds hK2 comprises a VH of SEQ ID NO: 166 and the VL of SEQ ID NO: 444, and the second binding domain that binds the lymphocyte antigen comprises a scFv of SEQ ID NO: 331; and/or
- ~~iiie.~~ the isolated multispecific protein comprises a HC1 of SEQ ID NO: 355 a LC1 of SEQ ID NO: 445 and a HC2 of SEQ ID NO: 360;

~~171. An isolated anti-hK2/anti-CD3 protein comprising a first domain that binds hK2 and a second domain that binds CD3, i. wherein~~

- ~~ia.~~ the first binding domain that binds hK2 comprises a HCDR1, a HCDR2, a HCDR3, a LCDR1, a LCDR2 and a LCDR3 of SEQ ID NOs: 176, 177, 178, 179, 180 and 181, respectively, and the second domain that binds the lymphocyte antigen comprises the HCDR1, the HCDR2, the HCDR3, the LCDR1, the LCDR2 and the LCDR3 of SEQ ID NOs: 255, 256, 257, 258, 259 and 261, respectively;
- ~~iib.~~ the first binding domain that binds hK2 comprises a VH of SEQ ID NO: 164 and the VL of SEQ ID NO: 165, and the second binding domain that binds the lymphocyte antigen comprises a scFv of SEQ ID NO: 331; and/or
- ~~iiie.~~ the isolated multispecific protein comprises a HC1 of SEQ ID NO: 356, a LC1 of SEQ ID NO: 222 and a HC2 of SEQ ID NO: 360;

~~172. An isolated anti-hK2/anti-CD3 protein comprising a first domain that binds hK2 and a second domain that binds CD3, j. wherein~~

- ~~ia.~~ the first binding domain that binds hK2 comprises a HCDR1, a HCDR2, a HCDR3, a LCDR1, a LCDR2 and a LCDR3 of SEQ ID NOs: 188, 189, 190, 191, 192 and 193, respectively, and the second domain that binds the lymphocyte antigen comprises the HCDR1, the HCDR2, the HCDR3, the LCDR1, the LCDR2 and the LCDR3 of SEQ ID NOs: 116, 117, 118, 119, 120 and 121, respectively;

iib. the first binding domain that binds hK2 comprises a scFv of SEQ ID NO: 325, and the second binding domain that binds the lymphocyte antigen comprises a VH of SEQ ID NO: 122 and a VL of SEQ ID NO: 123; and/or

iiie. the isolated multispecific protein comprises a HC1 of SEQ ID NO: 353, a HC2 of SEQ ID NO: 359 and a LC2 of SEQ ID NO: 272;

~~173. An isolated anti-hK2/anti-CD3 protein comprising a first domain that binds hK2 and a second domain that binds CD3, k. wherein~~

ia. the first binding domain that binds hK2 comprises a HCDR1, a HCDR2, a HCDR3, a LCDR1, a LCDR2 and a LCDR3 of SEQ ID NOs: 206, 207, 208, 182, 470, 209, respectively, and the second domain that binds the lymphocyte antigen comprises the HCDR1, the HCDR2, the HCDR3, the LCDR1, the LCDR2 and the LCDR3 of SEQ ID NOs: 116, 117, 118, 119, 120 and 121, respectively;

iib. the first binding domain that binds hK2 comprises a scFv of SEQ ID NO: 316, and the second binding domain that binds the lymphocyte antigen comprises a VH of SEQ ID NO: 122 and a VL of SEQ ID NO: 123; and/or

iiie. the isolated multispecific protein comprises a HC1 of SEQ ID NO: 357, a HC2 of SEQ ID NO: 359 and a LC2 of SEQ ID NO: 272;

~~174. An isolated anti-hK2/anti-CD3 protein comprising a first domain that binds hK2 and a second domain that binds CD3, l. wherein~~

ia. the first binding domain that binds hK2 comprises a HCDR1, a HCDR2, a HCDR3, a LCDR1, a LCDR2 and a LCDR3 of SEQ ID NOs: 206, 207, 208, 182, 470, 209, respectively, and the second domain that binds the lymphocyte antigen comprises the HCDR1, the HCDR2, the HCDR3, the LCDR1, the LCDR2 and the LCDR3 of SEQ ID NOs: 255, 256, 257, 258, 259, and 261, respectively;

iib. the first binding domain that binds hK2 comprises a scFv of SEQ ID NO: 316, and the second binding domain that binds the lymphocyte antigen comprises a VH of SEQ ID NO: 248 and a VL of SEQ ID NO: 151; and/or

iiie. the isolated multispecific protein comprises a HC1 of SEQ ID NO: 357, a HC2 of SEQ ID NO: 358 and a LC2 of SEQ ID NO: 267; or:

~~175. An isolated anti-hK2/anti-CD3 protein comprising a first domain that binds hK2 and a second domain that binds CD3, m. wherein~~

ia. the first binding domain that binds hK2 comprises a HCDR1, a HCDR2, a HCDR3, a LCDR1, a LCDR2 and a LCDR3 of SEQ ID NOs: 170, 171, 172, 173, 174 and 175, respectively, and the second domain that binds the lymphocyte

antigen comprises the HCDR1, the HCDR2, the HCDR3, the LCDR1, the LCDR2 and the LCDR3 of SEQ ID NOs: 255, 256, 257, 258, 259 and 261, respectively;

iib. the first binding domain that binds hK2 comprises a VH of SEQ ID NO: 162 and the VL of SEQ ID NO: 163, and the second binding domain that binds the lymphocyte antigen comprises a scFv of SEQ ID NO: 331; and/or

iiie. the isolated multispecific protein comprises a HC1 of SEQ ID NO: 361, a LC1 of SEQ ID NO: 221 and a HC2 of SEQ ID NO: 362.

22204. A chimeric antigen receptor (CAR) comprising:

- a. an extracellular domain comprising an antigen binding domain that binds hK2;
- b. a transmembrane domain; and
- c. an intracellular signaling domain optionally comprising at least one co-stimulatory domain.

23205. The CAR of claim 22204,:

a. further comprising a CD8a-hinge region;-

~~206. The CAR of claim 204 or 205, b.~~ wherein

ia. the transmembrane domain comprises a CD8a transmembrane region (CD8a-TM) polypeptide; and

iib. the intracellular signaling domain comprises a co-stimulatory domain comprising a TNF receptor superfamily member 9 (CD137) component and a primary signaling domain comprising a T-cell surface glycoprotein CD3 zeta chain (CD3z) component;-

~~207. The CAR of claim 204 or 206, c.~~ wherein

ia. the CD8a-hinge region comprises an amino acid sequence that is at least 90% identical to the amino acid sequence of SEQ ID NO: 25;

iib. the transmembrane domain comprises an amino acid sequence that is at least 90% identical to the amino acid sequence of SEQ ID NO: 26; and/or

iiie. the intracellular signaling domain comprises a co-stimulatory domain having an amino acid sequence that is at least 90% identical to the amino acid sequence of SEQ ID NO: 27, and a primary signaling domain having an amino acid sequence that is at least 90% identical to the amino acid sequence of SEQ ID NO: 28;-

~~208. The CAR of any one of claims 204-207, d.~~ wherein the antigen binding domain that

binds hK2 comprises the HCDR1 of SEQ ID NOs: 63, 72, 141, 147, 170, 176, 188, 194, 196, 198, 200, 206 or 216, the HCDR2 of SEQ ID NOs: 64, 65, 73, 142, 148, 171, 177, 183, 189, 195, 197, 199, 201, 207, or 217, the HCDR3 of SEQ ID NOs: 66, 143, 172, 178, 184, 190, 208, or 218, the LCDR1 of SEQ ID NOs: 67, 68, 144, 173, 179,

182, 185 or 191, the LCDR2 of SEQ ID NOs: 69, 70, 145, 174, 180, 186, 192 or 470 and the LCDR3 of SEQ ID NOs: 71, 146, 175, 181, 187, 193, or 209;

~~209. The CAR of any one of claims 204-208, e,~~ wherein the antigen binding domain that binds hK2 comprises the HCDR1, the HCDR2, the HCDR3, the LCDR1, the LCDR2 and the LCDR3 of

- ia. SEQ ID NOs: 63, 64, 66, 67, 69 and 71, respectively;
- ib. SEQ ID NOs: 63, 65, 66, 67, 69 and 71, respectively;
- ic. SEQ ID NOs: 63, 65, 66, 68, 70 and 71, respectively;
- id. SEQ ID NOs: 141, 142, 143, 144, 145 and 146, respectively;
- ie. SEQ ID NO: 170, 171, 172, 173, 174, and 175, respectively;
- if. SEQ ID NO: 176, 177, 178, 179, 180, and 181, respectively;
- ig. SEQ ID NO: 170, 183, 184, 185, 186, and 187, respectively;
- ih. SEQ ID NO: 188, 189, 190, 191, 192, and 193, respectively;
- ix. SEQ ID NO: 206, 207, 208, 182, 470, or 209, respectively;
- xj. SEQ ID NOs: 72, 73, 66, 67, 69 and 71, respectively;
- xk. SEQ ID NOs: 72, 73, 66, 68, 70 and 71, respectively;
- xil. SEQ ID NOs: 147, 148, 143, 144, 145 and 146, respectively;
- xim. SEQ ID NOs: 194, 195, 172, 173, 174 and 175, respectively;
- xiv. SEQ ID NOs: 196, 197, 178, 179, 180 and 181, respectively;
- xv. SEQ ID NOs: 198, 199, 184, 185, 186 and 187, respectively;
- xvi. SEQ ID NOs: 200, 201, 190, 191, 192 and 193, respectively; or
- xvii. SEQ ID NOs: 216, 217, 218, 182, 470 and 209, respectively;

~~210. The CAR of any one of claims 204-209, f,~~ wherein the antigen binding domain that binds hK2 comprises:

- i. the LCDR1, the LCDR2 and the LCDR3 of the VL of SEQ ID NO: 163 and the HCDR1, the HCDR2 and the HCDR3 of the VH of SEQ ID NO: 162; or;

~~211. The CAR of any one of claims 204-209, wherein the antigen binding domain that binds hK2 comprises~~ ii. the LCDR1, the LCDR2 and the LCDR3 of the VL of SEQ ID NO: 138 and the HCDR1, the HCDR2 and the HCDR3 of the VH of SEQ ID NO: 137; or the LCDR1, the LCDR2 and the LCDR3 of the VL of SEQ ID NO: 140 and the HCDR1, the HCDR2 and the HCDR3 of the VH of SEQ ID NO: 139;

~~212. The CAR of any one of claims 204-211, g,~~ wherein the antigen binding domain that binds hK2 comprises

- ia. the VH of SEQ ID NO: 137 and the VL of SEQ ID NO: 138;
- ib. the VH of SEQ ID NO: 162 and the VL of SEQ ID NO: 163;

- iiie. the VH of SEQ ID NO: 164 and the VL of SEQ ID NO: 165;
- ivd. the VH of SEQ ID NO: 166 and the VL of SEQ ID NO: 167;
- ye. the VH of SEQ ID NO: 168 and the VL of SEQ ID NO: 169;
- yif. the VH of SEQ ID NO: 204 and the VL of SEQ ID NO: 205; or
- yig. the VH of SEQ ID NO: 166 and the VL of SEQ ID NO: 444; and/or;

~~214. The CAR of any one of claims 204-211, h.~~ wherein the antigen binding domain that binds hK2 comprises a VL comprising an amino acid sequence which is at least 80% (e.g. at least 85%, at least 90%, at least 95%, at least 99% or 100%) identical to the amino acid sequence of SEQ ID NO: 138 or SEQ ID NO: 140 and a VH comprising an amino acid sequence which is at least 80% (e.g. at least 85%, at least 90%, at least 95%, at least 99% or 100%) identical to the amino acid sequence of SEQ ID NO: 137 or SEQ ID NO: 139.

~~242~~213. The CAR of ~~any one of claims 22 or 23~~~~204-212~~, wherein the antigen binding domain that binds hK2 comprises the VH of SEQ ID NO: 75 and the VL of SEQ ID NO: 74.

~~215. ——— The CAR of claim 213, optionally~~ wherein the antigen binding domain that binds hK2 comprises the VL of SEQ ID NOs: 1, 2, 3, 140 or 160 and/or the VH of SEQ ID NOs: 4, 5, 6, 139, 159, or 161.

~~216. ——— The CAR of claim 215, for example~~ wherein the antigen binding domain that binds hK2 comprises

- a. the VH of SEQ ID NO: 4 and the VL of SEQ ID NO: 1;
- b. the VH of SEQ ID NO: 4 and the VL of SEQ ID NO: 2;
- c. the VH of SEQ ID NO: 4 and the VL of SEQ ID NO: 3;
- d. the VH of SEQ ID NO: 4 and the VL of SEQ ID NO: 140;
- e. the VH of SEQ ID NO: 4 and the VL of SEQ ID NO: 160;
- f. the VH of SEQ ID NO: 5 and the VL of SEQ ID NO: 1;
- g. the VH of SEQ ID NO: 5 and the VL of SEQ ID NO: 3;
- h. the VH of SEQ ID NO: 5 and the VL of SEQ ID NO: 140;
- i. the VH of SEQ ID NO: 5 and the VL of SEQ ID NO: 160;
- j. the VH of SEQ ID NO: 6 and the VL of SEQ ID NO: 1;
- k. the VH of SEQ ID NO: 6 and the VL of SEQ ID NO: 2;
- l. the VH of SEQ ID NO: 6 and the VL of SEQ ID NO: 3;
- m. the VH of SEQ ID NO: 6 and the VL of SEQ ID NO: 140;
- n. the VH of SEQ ID NO: 6 and the VL of SEQ ID NO: 160;
- o. the VH of SEQ ID NO: 139 and the VL of SEQ ID NO: 1;
- p. the VH of SEQ ID NO: 139 and the VL of SEQ ID NO: 2;
- q. the VH of SEQ ID NO: 139 and the VL of SEQ ID NO: 3;

- r. the VH of SEQ ID NO: 139 and the VL of SEQ ID NO: 140;
- s. the VH of SEQ ID NO: 139 and the VL of SEQ ID NO: 160;
- t. the VH of SEQ ID NO: 159 and the VL of SEQ ID NO: 1;
- u. the VH of SEQ ID NO: 159 and the VL of SEQ ID NO: 2;
- v. the VH of SEQ ID NO: 159 and the VL of SEQ ID NO: 3;
- w. the VH of SEQ ID NO: 159 and the VL of SEQ ID NO: 140;
- x. the VH of SEQ ID NO: 159 and the VL of SEQ ID NO: 160;
- y. the VH of SEQ ID NO: 161 and the VL of SEQ ID NO: 1;
- z. the VH of SEQ ID NO: 159 and the VL of SEQ ID NO: 2;
- aa. the VH of SEQ ID NO: 161 and the VL of SEQ ID NO: 3;
- bb. the VH of SEQ ID NO: 161 and the VL of SEQ ID NO: 140; or
- cc. the VH of SEQ ID NO: 161 and the VL of SEQ ID NO: 160.

~~252~~217. The CAR of any one of claims ~~22-24~~~~204~~ 216,

a. wherein the antigen binding domain that binds hK2 is a scFv;

~~218. The CAR of claim 217, optionally wherein:~~

i. the scFv comprises a first linker (L1) between the VL and the VH;

~~219. The CAR of claim 218, for example wherein the L1 comprises the amino acid sequence of SEQ ID NO: 7;~~

~~220. The CAR of claim 219, optionally wherein:~~

A. the scFv comprises the amino acid sequence of SEQ ID NOs: 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 133, 134, 135, 136, 308, 316, 318, 319, 320, 321, 322, 323, 324, 325, 404, 405, 406, 407, 408, or 409;

~~221. The CAR of claim 219, wherein B.~~ the scFv comprises an amino acid sequence which is at least 80% (e.g. at least 90%, at least 95%, at least 98%, at least 99% or 100%) identical to the amino acid sequence of SEQ ID NO: 404 or SEQ ID NO: 405; and/or

~~222. The CAR of claim 219, wherein C.~~ the scFv comprises an amino acid sequence which is at least 80% (e.g. at least 90%, at least 95%, at least 98%, at least 99% or 100%) identical to the amino acid sequence of SEQ ID NO: 133, SEQ ID NO: 134, SEQ ID NO: 135 or SEQ ID NO: 136; and/or

~~223. The CAR of any of claims 217-222 wherein~~ ii. the extracellular domain comprising the antigen binding domain that binds hK2;

A. further comprises a signal polypeptide;

~~224. The CAR of claim 223, optionally wherein the signal polypeptide comprises the amino acid sequence of SEQ ID NO: 24;~~

- ~~231. The CAR of any of claims 223-230, wherein the extracellular domain comprising the antigen-binding domain that binds hK2-B. _____ comprises the amino acid sequence of SEQ ID NOs: 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 149, 150, 151, 152, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, or 425;:-~~
- ~~232. The CAR of any of claims 223-230, wherein the extracellular domain comprising the antigen-binding domain that binds hK2-C. _____ comprises an amino acid sequence which is at least 80% (e.g. at least 90%, at least 95%, at least 98%, at least 99% or 100%) identical to the amino acid sequence of SEQ ID NO: 416 or SEQ ID NO: 417; and/or:-~~
- ~~233. The CAR of any of claims 223-230, wherein the extracellular domain comprising the antigen-binding domain that binds hK2-D. _____ comprises an amino acid sequence which is at least 80% (e.g. at least 90%, at least 95%, at least 98%, at least 99% or 100%) identical to the amino acid sequence of SEQ ID NO: 149, SEQ ID NO: 150, SEQ ID NO: 151 or SEQ ID NO: 152;:-~~
225. The CAR of any one of claims 204-224, b, wherein the intracellular signaling domain comprises a polypeptide component selected from the group consisting of a TNF receptor superfamily member 9 (CD137) component, a T-cell surface glycoprotein CD3 zeta chain (CD3z) component, a cluster of differentiation (CD27) component, a cluster of differentiation superfamily member component, and a combination thereof;:-
226. The CAR of any one of claims 204-225, c, wherein the CD137 component comprises the amino acid sequence of SEQ ID NO: 27;:-
227. The CAR of any one of claims 204-226, d, wherein the CD3z component comprises an amino acid sequence of SEQ ID NO: 28;:-
228. The CAR of any one of claims 204-227, e, wherein the intracellular signaling domain comprises an amino acid sequence of SEQ ID NO: 45;:-
229. The CAR of any one of claims 204-228, f, wherein the CD8a-TM polypeptide comprises an amino acid sequence of SEQ ID NO: 26;:-
230. The CAR of any one of claims 204-229, g, wherein the CD8a-hinge region comprises an amino acid sequence of SEQ ID NO: 25; and/or:-
234. The CAR of any one of claims 204-233, h, wherein the CAR comprises:
- i. _____ the amino acid sequence of SEQ ID NOs: 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 153, 154, 155, 156, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, or 441;:-

~~235. The CAR of any one of claims 204-233, wherein the CAR comprises ii. an amino acid sequence which is at least 80% (e.g. at least 90%, at least 95%, at least 98%, at least 99% or 100%) identical to the amino acid sequence of SEQ ID NO: 432 or SEQ ID NO: 433; or-~~

~~236. The CAR of any one of claims 204-233, wherein the CAR comprises iii. an amino acid sequence which is at least 80% (e.g. at least 90%, at least 95%, at least 98%, at least 99% or 100%) identical to the amino acid sequence of SEQ ID NO: 153, SEQ ID NO: 154, SEQ ID NO: 155 or SEQ ID NO: 156.~~

~~261~~76. An:

a. ~~immunoconjugate comprising the isolated protein of any one of claims 1-1395 conjugated to a therapeutic agent or an imaging agent;-~~

~~184~~b. ~~An immunoconjugate comprising the isolated bispecific protein of any one of claims 14-2196-175 conjugated to a therapeutic agent or an imaging agent;-~~

~~237. An c. isolated lymphocyte expressing the CAR of any one of claims 22-25204-236.~~

~~238. The isolated lymphocyte of claim 237, optionally wherein the lymphocyte is a T lymphocyte-~~

~~239. The isolated lymphocyte of claim 238, for example wherein the lymphocyte is a natural killer (NK) cell;-~~

~~203. An d. anti-idiotypic antibody binding to the isolated protein of any one of claims 1-1395; or-~~

~~240. An e. isolated polynucleotide encoding the CAR of any one of claims 22-25204-236.~~

~~271~~77. A pharmaceutical composition comprising:

a. ~~the isolated protein of any one of claims 1-1395 and a pharmaceutically acceptable carrier;-~~

~~185. A pharmaceutical composition comprising b. the isolated bispecific protein of any one of claims 14-2196-175 and a pharmaceutically acceptable carrier; or-~~

~~243. A pharmaceutical composition comprising c. the lymphocyte of any one of claims 26c237-239 and a pharmaceutically acceptable excipient.~~

~~282~~02. A:

a. ~~kit comprising the isolated protein of any one of claims 1-1395, the isolated bispecific protein of any one of claims 14-2196-175, the immunoconjugate of claim 26a or 26b176 or 184, or the pharmaceutical composition of claim 27a177 or 27b185;-~~

~~178. A b. polynucleotide encoding the isolated protein of any one of claims 1-2195;-~~

~~179. A c. polynucleotide~~

~~ia. encoding the isolated protein of any one of claims 1-1395; and/or~~

iib. comprising a polynucleotide sequence of SEQ ID NOs: 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 263, 271, 274, 282, 292, 293, 294, 295, 303, 304, 305, 306, 312, 317, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 450 or 451;

~~180. A~~d. polynucleotide

ia. encoding an isolated protein which is at least 80% (e.g. at least 85%, at least 90%, at least 95%, at least 99% or 100%) identical to the isolated protein of any one of claims 1-~~139~~5; and/or

iib. comprising a polynucleotide sequence which is at least 80% (e.g. at least 85%, at least 90%, at least 95%, at least 99% or 100%) identical to the polynucleotide sequence of SEQ ID NOs: 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 263, 271, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 292, 293, 294, 295, 296, 297, 303, 304, 305, 306, 312, 316, 317, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 446, 450 or 451;

~~186. A~~e. polynucleotide

ia. encoding the bispecific protein of any one of claims ~~14-2196-175~~; and/or

iib. comprising a polynucleotide sequence of SEQ ID NOs: 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 263, 271, 274, 282, 292, 293, 294, 295, 303, 304, 305, 306, 312, 316, 317, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 450 or 451; or;

~~187. A~~f. polynucleotide

ia. encoding an isolated protein which is at least 80% (e.g. at least 85%, at least 90%, at least 95%, at least 99% or 100%) identical to the isolated protein of any one of claims ~~14-2196-175~~; and/or

iib. comprising a polynucleotide sequence which is at least 80% (e.g. at least 85%, at least 90%, at least 95%, at least 99% or 100%) identical to the polynucleotide sequence of SEQ ID NOs: 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 263, 271, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 292, 293, 294, 295, 296, 297, 303, 304, 305, 306, 312, 316, 317, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 446, 450 or 451.

~~29181.~~ A vector comprising:

a. the polynucleotide of claim ~~28c or 28d179 or 180~~;

~~188. A vector comprising~~ b. the polynucleotide of claim ~~28e or 28f186 or 187~~; or;

~~241. A vector comprising~~ c. the polynucleotide of claim ~~26e~~240.

- ~~301~~182. A host cell comprising:
- a. ~~the vector of claim 29a181;~~
 - ~~189. A host cell comprising~~ b. the vector of claim ~~29b188;~~ or
 - ~~242. A host cell comprising~~ c. the polynucleotide of claim ~~26e240~~ or the vector of claim ~~29c241.~~
- ~~31~~183. A method of producing:
- a. ~~the isolated protein of any one of claims 1-1395, comprising culturing the host cell of claim 30a182 in conditions that the protein is expressed, and recovering the protein produced by the host cell; or-~~
 - ~~190. A method of producing~~ b. the isolated bispecific protein of any one of claims ~~14-2196-175,~~ comprising culturing the host cell of claim ~~30b189~~ in conditions that the multispecific protein is expressed, and recovering the multispecific protein produced by the host cell.
- ~~32~~191. ~~A method of treating a hK2 expressing cancer in a subject, comprising administering a therapeutically effective amount of~~Use of the isolated protein of any one of claims 1-~~1395,~~ the isolated bispecific protein of any one of claims ~~14-2196-175,~~ the immunoconjugate of claim ~~26a or 26b176 or 184,~~ or the pharmaceutical composition of claim ~~27a or 27b177 or 185 to the subject for a time sufficient to treat the hK2 expressing cancer~~ for the manufacture of a medicament for:
- a. ~~the treatment~~ing of a hK2 expressing cancer in a subject;-
 - ~~192. A method of~~ b. the treatment of a hK2 expressing cancer in a subject, wherein the medicament is for reducing the amount of hK2 expressing tumor cells in a subject;- comprising administering the isolated protein of any one of claims 1-95, the isolated bispecific protein of any one of claims 96-175, the immunoconjugate of claim 176 or 184, or the pharmaceutical composition of claim 177 or 185 to the subject for a time sufficient to reduce the amount of hK2 expressing tumor cells.
 - ~~193. A method of~~ c. the treatment of a hK2 expressing cancer in a subject, wherein the medicament is for preventing establishment of a hK2 expressing cancer in a subject; ~~or-~~ comprising administering the isolated protein of any one of claims 1-95, the isolated bispecific protein of any one of claims 95-175, the immunoconjugate of claim 176 or 184, or the pharmaceutical composition of claim 177 or 185 to the subject to prevent establishment of the hK2 expressing cancer in the subject.
 - ~~194. A method of~~ d. treating the treatment of a noncancerous condition in a subject at risk of developing a hK2 expressing cancer, comprising administering the isolated protein of any one of claims 1-95, ~~the isolated multispecific protein of any one of claims 96-~~

175, the immunoconjugate of claim 176 or 184, or the pharmaceutical composition of claim 177 or 185 to the subject to treat the noncancerous condition.

~~33~~195. The ~~use~~method of any one of claims ~~32~~191-194, wherein:

a. ~~the~~ hK2 expressing cancer is a prostate cancer or a breast cancer;

196. The method of claim 195, optionally wherein:

i. ~~the~~ prostate cancer is relapsed, refractory, malignant or castration resistant prostate cancer, or any combination thereof;

197. ~~The method of claim 195, wherein~~ ii. ~~the~~ breast cancer is androgen receptor (AR) positive breast cancer, relapsed, refractory or malignant breast cancer, or any combination thereof; or:

198. ~~The method of claim 195, wherein~~ iii. ~~the~~ noncancerous condition is an enlarged prostate, benign prostate hyperplasia (BPH) or a condition with high prostate specific antigen (PSA) levels in the absence of diagnosed prostate cancer; and/or:

199. ~~The method of any one of claims 191-198, wherein~~ b. ~~the~~ isolated protein or the isolated multispecific protein is administered in combination with a second therapeutic agent;

200. ~~The method of claim 199, optionally~~ wherein the second therapeutic agent is surgery, chemotherapy, androgen deprivation therapy or radiation, or any combination thereof.

~~34~~201. Use of the immunoconjugate of claim 26a or 26b in A a method of detecting in vivo the presence of prostate cancer or breast cancer in a subject, the method comprising administering the immunoconjugate ~~of claim 176 or 184~~ to a subject suspected to have prostate cancer or breast cancer and visualizing the biological structures to which the immunoconjugate is bound, thereby detecting the presence of prostate cancer or breast cancer.

~~35~~244. Use of the lymphocyte of claim 26c for the manufacture of a medicament for A method of the treating/treatment of a subject having a hK2 expressing cancer, wherein an effective amount of the lymphocyte is to be administered to a subject in need thereof; ~~the method comprising: administering a therapeutically effective amount of the lymphocyte of any one of claims 237-239 to a subject in need thereof, whereby the lymphocyte mediates killing of the hK2-expressing cancer in the subject.~~

245. ~~The method of claim 244, wherein the hK2-expressing cancer is prostate cancer or breast cancer.~~

246. ~~The method of claim 245, wherein the hK2-expressing cancer is prostate cancer.~~

~~36~~247. A method of targeted killing of a cancer cell, the method comprising: contacting the cancer cell with ~~The lymphocyte of any one of claims 26c for use in a method of targeted~~

killing of a cancer cell~~244-246~~, whereby wherein the lymphocyte is to be contacted with the cancer cell to induces targeted killing of the cancer cell.

~~37248~~. The use of claim 35 or the method of claim ~~36~~²⁴⁷, wherein:

- a. the hK2 expressing cancer is prostate cancer or breast cancer, for example wherein the hK2 expressing cancer is prostate cancer; or
- b. the cancer cell is a prostate cancer cell or a breast cancer cell-

~~249. The method of claim 248, for example wherein the cancer cell is the prostate cancer cell.~~

~~38250~~. A method of detecting the presence of a cancer in a subject, comprising:

- a. contacting a cell sample obtained from the subject with the CAR of any one of claims ~~22-25~~²⁰⁴⁻²³⁶, thereby forming a CAR-cell complex, and
- b. detecting the CAR-cell complex, wherein detection of the CAR-cell complex is indicative of the presence of the cancer in the subject.