CLAIMS:

1. An isolated or purified T-cell receptor (TCR) comprising the amino acid sequences of
(a) all of SEQ ID NOs: 1-3,
(b) all of SEQ ID NOs: 4-6,
(c) all of SEQ ID NOs: 31-33,
(d) all of SEQ ID NOs: 34-36,
(e) all of SEQ ID NOs: 1-6, or
(f) all of SEQ ID NOs: 31-36,
wherein the TCR has antigenic specificity for a mutated human RAS amino acid sequence presented by a human leukocyte antigen (HLA) Class II molecule, and
wherein the mutated human RAS amino acid sequence is a mutated human Kirsten rat sarcoma viral oncogene homolog (KRAS), a mutated human Harvey rat sarcoma viral oncogene homolog (HRAS), or a mutated human Neuroblastoma rat sarcoma viral oncogene homolog (NRAS) amino acid sequence.

~~2. The isolated or purified TCR according to claim 1, wherein the mutated human RAS amino acid sequence is SEQ ID NO: 30.~~

~~3. The isolated or purified TCR according to claim 1 or 2, wherein the TCR does not have antigenic specificity for the wild-type human RAS amino acid sequence of SEQ ID NO: 27.~~

~~4. The isolated or purified TCR according to any one of claims 1-3, wherein the HLA Class II molecule is an HLA-DP molecule.~~

~~5. The isolated or purified TCR according to any one of claims 1-4, wherein the HLA Class II molecule is an HLA-DPB1 molecule.~~

2.~~6.~~ The isolated or purified TCR according to ~~any one of claims 1-5~~ claim 1, wherein the HLA Class II molecule is an HLA-DPB1*03:01 molecule.

7. The isolated or purified TCR according to any one of claims 1-6, comprising the amino acid sequence of:

(i) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 7,

(ii) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 129,

(iii) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 8,

(iv) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 63,

(v) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 130,

(vi) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 64,

(vii) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 65,

(viii) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 66,

(ix) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 37,

(x) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 38,

(xi) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 69,

(xii) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 70,

(xiii) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 71,

(xiv) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 47,

(xv) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 48,

(xvi) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 49,

(xvii) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 50,

(xviii) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 67,

(xix) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 68,

(xx) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 76,

(xxi) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 72,

(xxii) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 73,

(xxiii) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 102, or

(xxxix) both (i) and (iii); both (i) and (vi); both (i) and (vii); both (i) and (viii); both (ii) and (iii); both (ii) and (vi); both (ii) and (vii); both (ii) and (viii); both (iii) and (iv); both (iii) and (v); both (iv) and (vi); both (iv) and (vii); both (iv) and (viii); both (v) and (vi); both (v) and (vii); both (v) and (viii); both (ix) and (x); both (ix) and (xi); both (ix) and (xii); both (ix) and (xiii); both (xiv) and (xv); both (xvi) and (xvii); both (xviii) and (xix); both (xviii) and (xx); both (xxi) and (xxii); or both (xxi) and (xxiii).

3.8. The isolated or purified TCR according to any one of claims 1-6 claim 1 or 2, comprising the amino acid sequence of:

(i) SEQ ID NO: 7,

(ii) SEQ ID NO: 129,

(iii) SEQ ID NO: 8,

(iv) SEQ ID NO: 63,

(v) SEQ ID NO: 130,

(vi) SEQ ID NO: 64,

(vii) SEQ ID NO: 65,

(viii) SEQ ID NO: 66,

(ix) SEQ ID NO: 37,

(x) SEQ ID NO: 38,

(xi) SEQ ID NO: 69,

(xii) SEQ ID NO: 70,

(xiii) SEQ ID NO: 71,

(xiv) SEQ ID NO: 47,

(xv) SEQ ID NO: 48,

(xvi) SEQ ID NO: 49,

(xvii) SEQ ID NO: 50,

(xviii) SEQ ID NO: 67,

(xix) SEQ ID NO: 68,

(xx) SEQ ID NO: 76,

(xxi) SEQ ID NO: 72,

(xxii) SEQ ID NO: 73,

(xxiii) SEQ ID NO: 102, or

(xxxix) both (i) and (iii); both (i) and (vi); both (i) and (vii); both (i) and (viii); both (ii) and (iii); both (ii) and (vi); both (ii) and (vii); both (ii) and (viii); both (iii) and (iv); both (iii) and (v); both (iv) and (vi); both (iv) and (vii); both (iv) and (viii); both (v) and (vi); both (v) and (vii); both (v) and (viii); both (ix) and (x); both (ix) and (xi); both (ix) and (xii); both (ix) and (xiii); both (xiv) and (xv); both (xvi) and (xvii); both (xviii) and (xix); both (xviii) and (xx); both (xxi) and (xxii); or both (xxi) and (xxiii).

~~9. The isolated or purified TCR of any one of claims 1-8, further comprising:~~

~~(a) an α chain constant region comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 17, wherein:~~

~~(i) X at position 48 of SEQ ID NO: 17 is Thr or Cys;~~

~~(ii) X at position 112 of SEQ ID NO: 17 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;~~

~~(iii) X at position 114 of SEQ ID NO: 17 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and~~

~~(iv) X at position 115 of SEQ ID NO: 17 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;~~

~~(b) a β chain constant region comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 18, wherein X at position 57 of SEQ ID NO: 18 is Ser or Cys; or~~

~~(c) both (a) and (b).~~

4.~~10.~~ The isolated or purified TCR of any one of ~~claims 1-8~~ claims 1-3, further comprising:

(a) an α chain constant region comprising the amino acid sequence of SEQ ID NO: 17, wherein:

(i) X at position 48 of SEQ ID NO: 17 is Thr or Cys;

(ii) X at position 112 of SEQ ID NO: 17 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 114 of SEQ ID NO: 17 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 115 of SEQ ID NO: 17 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(b) a β chain constant region comprising the amino acid sequence of SEQ ID NO: 18, wherein X at position 57 of SEQ ID NO: 18 is Ser or Cys; or

(c) both (a) and (b).

~~11. The isolated or purified TCR of any one of claims 1-10, comprising:~~

~~(a) an α chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 21, wherein:~~

~~(i) X at position 179 of SEQ ID NO: 21 is Thr or Cys;~~

~~(ii) X at position 243 of SEQ ID NO: 21 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;~~

~~(iii) X at position 245 of SEQ ID NO: 21 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and~~

~~(iv) X at position 246 of SEQ ID NO: 21 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;~~

(b) an α chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 131, wherein:

(i) X at position 180 of SEQ ID NO: 131 is Thr or Cys;

(ii) X at position 244 of SEQ ID NO: 131 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 246 of SEQ ID NO: 131 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 247 of SEQ ID NO: 131 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(c) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 22, wherein X at position 198 of SEQ ID NO: 22 is Ser or Cys;

(d) an α chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 79, wherein:

(i) X at position 179 of SEQ ID NO: 79 is Thr or Cys;

(ii) X at position 243 of SEQ ID NO: 79 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 245 of SEQ ID NO: 79 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 246 of SEQ ID NO: 79 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(e) an α chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 134, wherein:

(i) X at position 180 of SEQ ID NO: 134 is Thr or Cys;

(ii) X at position 244 of SEQ ID NO: 134 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 246 of SEQ ID NO: 134 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 247 of SEQ ID NO: 134 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(f) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 80, wherein X at position 198 of SEQ ID NO: 80 is Ser or Cys;

(g) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 85, wherein X at position 187 of SEQ ID NO: 85 is Ser or Cys;

(h) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 88, wherein X at position 187 of SEQ ID NO: 88 is Ser or Cys;

(i) an α chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 41, wherein:

(i) X at position 179 of SEQ ID NO: 41 is Thr or Cys;

(ii) X at position 243 of SEQ ID NO: 41 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 245 of SEQ ID NO: 41 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 246 of SEQ ID NO: 41 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(j) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 42, wherein X at position 197 of SEQ ID NO: 42 is Ser or Cys;

(k) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 105, wherein X at position 197 of SEQ ID NO: 105 is Ser or Cys;

(l) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 110, wherein X at position 186 of SEQ ID NO: 110 is Ser or Cys;

(m) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 113, wherein X at position 186 of SEQ ID NO: 113 is Ser or Cys;

(n) both (a) and (e); both (a) and (g); both (b) and (e); both (b) and (g); both (d) and (f); both (d) and (h); both (e) and (f); or both (e) and (h);

(o) both (i) and (j); both (i) and (k); both (i) and (l); or both (i) and (m);

(p) an α chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 55, wherein:

(i) X at position 160 of SEQ ID NO: 55 is Thr or Cys;

(ii) X at position 224 of SEQ ID NO: 55 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 226 of SEQ ID NO: 55 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 227 of SEQ ID NO: 55 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(q) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 56, wherein X at position 173 of SEQ ID NO: 56 is Ser or Cys;

(r) an α chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 93, wherein:

(i) X at position 159 of SEQ ID NO: 93 is Thr or Cys;

(ii) X at position 223 of SEQ ID NO: 93 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 225 of SEQ ID NO: 93 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 226 of SEQ ID NO: 93 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(s) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 94, wherein X at position 177 of SEQ ID NO: 94 is Ser or Cys;

(t) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 99, wherein X at position 172 of SEQ ID NO: 99 is Ser or Cys;

(u) an α chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 57, wherein:

(i) X at position 159 of SEQ ID NO: 57 is Thr or Cys;

(ii) X at position 223 of SEQ ID NO: 57 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 225 of SEQ ID NO: 57 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 226 of SEQ ID NO: 57 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(v) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 58, wherein X at position 172 of SEQ ID NO: 58 is Ser or Cys;

(w) an α chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 116, wherein:

(i) X at position 158 of SEQ ID NO: 116 is Thr or Cys;

(ii) X at position 222 of SEQ ID NO: 116 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 224 of SEQ ID NO: 116 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 225 of SEQ ID NO: 116 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(x) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 117, wherein X at position 176 of SEQ ID NO: 117 is Ser or Cys;

(y) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 122, wherein X at position 171 of SEQ ID NO: 122 is Ser or Cys;

(z) both (p) and (q); both (r) and (s); or both (r) and (t);

(aa) both (u) and (v); both (w) and (x); or both (w) and (y);

(bb) an α chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 23;

(cc) an α chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 133;

(dd) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 24;

(ee) an α chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 83;

(ff) an α chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 136;

(gg) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 84;

(hh) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 87;

(ii) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 90;

(jj) an α chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 77;

(kk) an α chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 132;

(ll) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 78;

(mm) an α chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 81;

(nn) an α chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 135;

(oo) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 82;

(pp) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 86;

(qq) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 89;

(rr) an α chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 39;

(ss) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 40;

(tt) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 107;

(uu) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 112;

(vv) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 115;

(ww) an α chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 103;

(xx) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 104;

(yy) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 106;

(zz) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 111;

(aaa) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 114;

(bbb) both of (bb) and (dd); both of (cc) and (dd); both of (ee) and (gg); both of (ff) and (gg); both of (bb) and (hh); both of (cc) and (hh); both of (ee) and (ii); or both of (ff) and (ii);

(ccc) both of (jj) and (ll); both of (kk) and (ll); both of (mm) and (oo); both of (nn) and (oo); both of (jj) and (pp); both of (kk) and (pp); both of (mm) and (qq); or both of (nn) and (qq);

(ddd) both of (rr) and (ss); both of (rr) and (tt); both of (rr) and (uu); or both of (rr) and (vv);

(eee) both of (ww) and (xx) both of (ww) and (yy); both of (ww) and (zz); or both of (ww) and (aaa);

(fff) an α chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 51;

(ggg) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 52;

(hhh) an α chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 97;

(iii) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 98;

(jjj) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 101;

(kkk) an α chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 91;

(lll) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 92;

(mmm) an α chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 95;

(nnn) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 96;

(ooo) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 100;

(ppp) an α chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 53;

~~(qqq) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 54;~~

~~(rrr) an a chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 120;~~

~~(sss) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 121;~~

~~(ttt) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 124;~~

~~(uuu) an α chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 108;~~

~~(vvv) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 109;~~

~~(www) an a chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 118;~~

~~(xxx) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 119;~~

~~(yyy) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 123;~~

~~(zzz) both of (fff) and (ggg); both of (hhh) and (iii); or both of (hhh) and (jjj);~~

~~(aaaa) both of (kkk) and (lll); both of (mmm) and (nnn); or both of (mmm) and (ooo);~~

~~(bbbb) both of (ppp) and (qqq); both of (rrr) and (sss); or both of (rrr) and (ttt) or~~

~~(cccc) both of (uuu) and (vvv); both of (www) and (xxx); or both of (www) and (yyy).~~

5.~~12.~~ The isolated or purified TCR of any one of ~~claims 1-10~~ claims 1-4, comprising:

(a) an α chain comprising the amino acid sequence of SEQ ID NO: 21, wherein:

(i) X at position 179 of SEQ ID NO: 21 is Thr or Cys;

(ii) X at position 243 of SEQ ID NO: 21 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 245 of SEQ ID NO: 21 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 246 of SEQ ID NO: 21 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(b) an α chain comprising the amino acid sequence of SEQ ID NO: 131, wherein:

(i) X at position 180 of SEQ ID NO: 131 is Thr or Cys;

(ii) X at position 244 of SEQ ID NO: 131 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 246 of SEQ ID NO: 131 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 247 of SEQ ID NO: 131 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(c) a β chain comprising the amino acid sequence of SEQ ID NO: 22, wherein X at position 198 of SEQ ID NO: 22 is Ser or Cys;

(d) an α chain comprising the amino acid sequence of SEQ ID NO: 79, wherein:

(i) X at position 179 of SEQ ID NO: 79 is Thr or Cys;

(ii) X at position 243 of SEQ ID NO: 79 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 245 of SEQ ID NO: 79 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 246 of SEQ ID NO: 79 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(e) an α chain comprising the amino acid sequence of SEQ ID NO: 134, wherein:

(i) X at position 180 of SEQ ID NO: 134 is Thr or Cys;

(ii) X at position 244 of SEQ ID NO: 134 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 246 of SEQ ID NO: 134 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 247 of SEQ ID NO: 134 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(f) a β chain comprising the amino acid sequence of SEQ ID NO: 80, wherein X at position 198 of SEQ ID NO: 80 is Ser or Cys;

(g) a β chain comprising the amino acid sequence of SEQ ID NO: 85, wherein X at position 187 of SEQ ID NO: 85 is Ser or Cys;

(h) a β chain comprising the amino acid sequence of SEQ ID NO: 88, wherein X at position 187 of SEQ ID NO: 88 is Ser or Cys;

(i) an α chain comprising the amino acid sequence of SEQ ID NO: 41, wherein:

(i) X at position 179 of SEQ ID NO: 41 is Thr or Cys;

(ii) X at position 243 of SEQ ID NO: 41 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 245 of SEQ ID NO: 41 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 246 of SEQ ID NO: 41 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(j) a β chain comprising the amino acid sequence of SEQ ID NO: 42, wherein X at position 197 of SEQ ID NO: 42 is Ser or Cys;

(k) a β chain comprising the amino acid sequence of SEQ ID NO: 105, wherein X at position 197 of SEQ ID NO: 105 is Ser or Cys;

(l) a β chain comprising the amino acid sequence of SEQ ID NO: 110, wherein X at position 186 of SEQ ID NO: 110 is Ser or Cys;

(m) a β chain comprising the amino acid sequence of SEQ ID NO: 113, wherein X at position 186 of SEQ ID NO: 113 is Ser or Cys;

(n) both (a) and (c); both (a) and (g); both (b) and (c); both (b) and (g); both (d) and (f); both (d) and (h); both (e) and (f); or both (e) and (h);

(o) both (i) and (j); both (i) and (k); both (i) and (l); or both (i) and (m);

(p) an α chain comprising the amino acid sequence of SEQ ID NO: 55, wherein:

(i) X at position 160 of SEQ ID NO: 55 is Thr or Cys;

(ii) X at position 224 of SEQ ID NO: 55 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 226 of SEQ ID NO: 55 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 227 of SEQ ID NO: 55 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(q) a β chain comprising the amino acid sequence of SEQ ID NO: 56, wherein X at position 173 of SEQ ID NO: 56 is Ser or Cys;

(r) an α chain comprising the amino acid sequence of SEQ ID NO: 93, wherein:

(i) X at position 159 of SEQ ID NO: 93 is Thr or Cys;

(ii) X at position 223 of SEQ ID NO: 93 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 225 of SEQ ID NO: 93 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 226 of SEQ ID NO: 93 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(s) a β chain comprising the amino acid sequence of SEQ ID NO: 94, wherein X at position 177 of SEQ ID NO: 94 is Ser or Cys;

(t) a β chain comprising the amino acid sequence of SEQ ID NO: 99, wherein X at position 172 of SEQ ID NO: 99 is Ser or Cys;

(u) an α chain comprising the amino acid sequence of SEQ ID NO: 57, wherein:

(i) X at position 159 of SEQ ID NO: 57 is Thr or Cys;

(ii) X at position 223 of SEQ ID NO: 57 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 225 of SEQ ID NO: 57 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 226 of SEQ ID NO: 57 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(v) a β chain comprising the amino acid sequence of SEQ ID NO: 58, wherein X at position 172 of SEQ ID NO: 58 is Ser or Cys;

(w) an α chain comprising the amino acid sequence of SEQ ID NO: 116, wherein:

(i) X at position 158 of SEQ ID NO: 116 is Thr or Cys;

(ii) X at position 222 of SEQ ID NO: 116 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 224 of SEQ ID NO: 116 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 225 of SEQ ID NO: 116 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(x) a β chain comprising the amino acid sequence of SEQ ID NO: 117, wherein X at position 176 of SEQ ID NO: 117 is Ser or Cys;

(y) a β chain comprising the amino acid sequence of SEQ ID NO: 122, wherein X at position 171 of SEQ ID NO: 122 is Ser or Cys;

(z) both (p) and (q); both (r) and (s); or both (r) and (t);

(aa) both (u) and (v); both (w) and (x); or both (w) and (y);

(bb) an α chain comprising the amino acid sequence of SEQ ID NO: 23;

(cc) an α chain comprising the amino acid sequence of SEQ ID NO: 133;

(dd) a β chain comprising the amino acid sequence of SEQ ID NO: 24;

(ee) an α chain comprising the amino acid sequence of SEQ ID NO: 83;

(ff) an α chain comprising the amino acid sequence of SEQ ID NO: 136;

(gg) a β chain comprising the amino acid sequence of SEQ ID NO: 84;

(hh) a β chain comprising the amino acid sequence of SEQ ID NO: 87;

(ii) a β chain comprising the amino acid sequence of SEQ ID NO: 90;

(jj) an α chain comprising the amino acid sequence of SEQ ID NO: 77;

(kk) an α chain comprising the amino acid sequence of SEQ ID NO: 132;

(ll) a β chain comprising the amino acid sequence of SEQ ID NO: 78;

(mm) an α chain comprising the amino acid sequence of SEQ ID NO: 81;

(nn) an α chain comprising the amino acid sequence of SEQ ID NO: 135;

(oo) a β chain comprising the amino acid sequence of SEQ ID NO: 82;

(pp) a β chain comprising the amino acid sequence of SEQ ID NO: 86;

(qq) a β chain comprising the amino acid sequence of SEQ ID NO: 89;

(rr) an α chain comprising the amino acid sequence of SEQ ID NO: 39;

(ss) a β chain comprising the amino acid sequence of SEQ ID NO: 40;

(tt) a β chain comprising the amino acid sequence of SEQ ID NO: 107;

(uu) a β chain comprising the amino acid sequence of SEQ ID NO: 112;

(vv) a β chain comprising the amino acid sequence of SEQ ID NO: 115;

(ww) an α chain comprising the amino acid sequence of SEQ ID NO: 103;

(xx) a β chain comprising the amino acid sequence of SEQ ID NO: 104;

(yy) a β chain comprising the amino acid sequence of SEQ ID NO: 106;

(zz) a β chain comprising the amino acid sequence of SEQ ID NO: 111;

(aaa) a β chain comprising the amino acid sequence of SEQ ID NO: 114;

(bbb) both of (bb) and (dd); both of (cc) and (dd); both of (ee) and (gg); both of (ff) and (gg); both of (bb) and (hh); both of (cc) and (hh); both of (ee) and (ii); or both of (ff) and (ii);

(ccc) both of (jj) and (ll); both of (kk) and (ll); both of (mm) and (oo); both of (nn) and (oo); both of (jj) and (pp); both of (kk) and (pp); both of (mm) and (qq); or both of (nn) and (qq);

(ddd) both of (rr) and (ss); both of (rr) and (tt); both of (rr) and (uu); or both of (rr) and (vv);

(eee) both of (ww) and (xx) both of (ww) and (yy); both of (ww) and (zz); or both of (ww) and (aaa);

(fff) an α chain comprising the amino acid sequence of SEQ ID NO: 51;

(ggg) a β chain comprising the amino acid sequence of SEQ ID NO: 52;

(hhh) an α chain comprising the amino acid sequence of SEQ ID NO: 97;

(iii) a β chain comprising the amino acid sequence of SEQ ID NO: 98;

(jjj) a β chain comprising the amino acid sequence of SEQ ID NO: 101;

(kkk) an α chain comprising the amino acid sequence of SEQ ID NO: 91;

(lll) a β chain comprising the amino acid sequence of SEQ ID NO: 92;

(mmm) an α chain comprising the amino acid sequence of SEQ ID NO: 95;

(nnn) a β chain comprising the amino acid sequence of SEQ ID NO: 96;

(ooo) a β chain comprising the amino acid sequence of SEQ ID NO: 100;

(ppp) an α chain comprising the amino acid sequence of SEQ ID NO: 53;

(qqq) a β chain comprising the amino acid sequence of SEQ ID NO: 54;

(rrr) an a chain comprising the amino acid sequence of SEQ ID NO: 120;

(sss) a β chain comprising the amino acid sequence of SEQ ID NO: 121;

(ttt) a β chain comprising the amino acid sequence of SEQ ID NO: 124;

(uuu) an α chain comprising the amino acid sequence of SEQ ID NO: 108;

(vvv) a β chain comprising the amino acid sequence of SEQ ID NO: 109;

(www) an a chain comprising the amino acid sequence of SEQ ID NO: 118;

(xxx) a β chain comprising the amino acid sequence of SEQ ID NO: 119;

(yyy) a β chain comprising the amino acid sequence of SEQ ID NO: 123;

(zzz) both of (fff) and (ggg); both of (hhh) and (iii); or both of (hhh) and (jjj);

(aaaa) both of (kkk) and (lll); both of (mmm) and (nnn); or both of (mmm) and (ooo);

(bbbb) both of (ppp) and (qqq); both of (rrr) and (sss); or both of (rrr) and (ttt) or (cccc) both of (uuu) and (vvv); both of (www) and (xxx); or both of (www) and (yyy).

6.~~13~~ An isolated or purified polypeptide comprising a functional portion of the TCR of any one of ~~claims 1-12~~ claims 1-5, wherein the functional portion comprises the amino acid sequences of:

(a) all of SEQ ID NOs: 1-3,

(b) all of SEQ ID NOs: 4-6,

(c) all of SEQ ID NOs: 31-33,

(d) all of SEQ ID NOs: 34-36,

(e) all of SEQ ID NOs: 1-6, or

(f) all of SEQ ID NOs: 31-36.

~~14. The isolated or purified polypeptide according to claim 13, wherein the functional portion comprises the amino acid sequence(s) of:~~

~~(i) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 7,~~

~~(ii) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 129,~~

~~(iii) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 8,~~

~~(iv) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 63,~~

~~(v) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 130,~~

~~(vi) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 64,~~

~~(vii) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 65,~~

~~(viii) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 66,~~

(ix) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 37,

(x) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 38,

(xi) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 69,

(xii) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 70,

(xiii) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 71,

(xiv) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 47,

(xv) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 48,

(xvi) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 49,

(xvii) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 50,

(xviii) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 67,

(xix) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 68,

(xx) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 76,

(xxi) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 72,

(xxii) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 73,

(xxiii) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 102, or

(xxxix) both (i) and (iii); both (i) and (vi); both (i) and (vii); both (i) and (viii); both (ii) and (iii); both (ii) and (vi); both (ii) and (vii); both (ii) and (viii); both (iii) and (iv); both

~~(iii) and (v); both (iv) and (vi); both (iv) and (vii); both (iv) and (viii); both (v) and (vi); both (v) and (vii); both (v) and (viii); both (ix) and (x); both (ix) and (xi); both (ix) and (xii); both (ix) and (xiii); both (xiv) and (xv); both (xvi) and (xvii); both (xviii) and (xix); both (xviii) and (xx); both (xxi) and (xxii); or both (xxi) and (xxiii).~~

7.~~15~~ The isolated or purified polypeptide according to ~~claim 13~~ claim 6, wherein the functional portion comprises the amino acid sequence(s) of:

(i) SEQ ID NO: 7,

(ii) SEQ ID NO: 129,

(iii) SEQ ID NO: 8,

(iv) SEQ ID NO: 63,

(v) SEQ ID NO: 130,

(vi) SEQ ID NO: 64,

(vii) SEQ ID NO: 65,

(viii) SEQ ID NO: 66,

(ix) SEQ ID NO: 37,

(x) SEQ ID NO: 38,

(xi) SEQ ID NO: 69,

(xii) SEQ ID NO: 70,

(xiii) SEQ ID NO: 71,

(xiv) SEQ ID NO: 47,

(xv) SEQ ID NO: 48,

(xvi) SEQ ID NO: 49,

(xvii) SEQ ID NO: 50,

(xviii) SEQ ID NO: 67,

(xix) SEQ ID NO: 68,

(xx) SEQ ID NO: 76,

(xxi) SEQ ID NO: 72,

(xxii) SEQ ID NO: 73,

(xxiii) SEQ ID NO: 102, or

(xxxix) both (i) and (iii); both (i) and (vi); both (i) and (vii); both (i) and (viii); both (ii) and (iii); both (ii) and (vi); both (ii) and (vii); both (ii) and (viii); both (iii) and (iv); both

(iii) and (v); both (iv) and (vi); both (iv) and (vii); both (iv) and (viii); both (v) and (vi); both (v) and (vii); both (v) and (viii); both (ix) and (x); both (ix) and (xi); both (ix) and (xii); both (ix) and (xiii); both (xiv) and (xv); both (xvi) and (xvii); both (xviii) and (xix); both (xviii) and (xx); both (xxi) and (xxii); or both (xxi) and (xxiii).

~~16. The isolated or purified polypeptide of any one of claims 13-15, further comprising:~~

~~(a) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 17, wherein:~~

~~(i) X at position 48 of SEQ ID NO: 17 is Thr or Cys;~~

~~(ii) X at position 112 of SEQ ID NO: 17 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;~~

~~(iii) X at position 114 of SEQ ID NO: 17 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and~~

~~(iv) X at position 115 of SEQ ID NO: 17 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;~~

~~(b) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 18, wherein X at position 57 of SEQ ID NO: 18 is Ser or Cys; or~~

~~(c) both (a) and (b).~~

8.~~17.~~ The isolated or purified polypeptide of ~~any one of claims 13-15~~ claim 6 or 7, further comprising:

(a) the amino acid sequence of SEQ ID NO: 17, wherein:

(i) X at position 48 of SEQ ID NO: 17 is Thr or Cys;

(ii) X at position 112 of SEQ ID NO: 17 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 114 of SEQ ID NO: 17 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 115 of SEQ ID NO: 17 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(b) the amino acid sequence of SEQ ID NO: 18, wherein X at position 57 of SEQ ID NO: 18 is Ser or Cys; or

(c) both (a) and (b).

18. The isolated or purified polypeptide of any one of claims 13-17, comprising:

(a) an α chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 21, wherein:

(i) X at position 179 of SEQ ID NO: 21 is Thr or Cys;

(ii) X at position 243 of SEQ ID NO: 21 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 245 of SEQ ID NO: 21 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 246 of SEQ ID NO: 21 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(b) an α chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 131, wherein:

(i) X at position 180 of SEQ ID NO: 131 is Thr or Cys;

(ii) X at position 244 of SEQ ID NO: 131 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 246 of SEQ ID NO: 131 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 247 of SEQ ID NO: 131 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(c) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 22, wherein X at position 198 of SEQ ID NO: 22 is Ser or Cys;

(d) an α chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 79, wherein:

(i) X at position 179 of SEQ ID NO: 79 is Thr or Cys;

(ii) X at position 243 of SEQ ID NO: 79 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 245 of SEQ ID NO: 79 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 246 of SEQ ID NO: 79 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(e) an α chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 134, wherein:

(i) X at position 180 of SEQ ID NO: 134 is Thr or Cys;

(ii) X at position 244 of SEQ ID NO: 134 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 246 of SEQ ID NO: 134 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 247 of SEQ ID NO: 134 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(f) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 80, wherein X at position 198 of SEQ ID NO: 80 is Ser or Cys;

(g) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 85, wherein X at position 187 of SEQ ID NO: 85 is Ser or Cys;

(h) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 88, wherein X at position 187 of SEQ ID NO: 88 is Ser or Cys;

(i) an α chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 41, wherein:

(i) X at position 179 of SEQ ID NO: 41 is Thr or Cys;

(ii) X at position 243 of SEQ ID NO: 41 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 245 of SEQ ID NO: 41 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 246 of SEQ ID NO: 41 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(j) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 42, wherein X at position 197 of SEQ ID NO: 42 is Ser or Cys;

(k) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 105, wherein X at position 197 of SEQ ID NO: 105 is Ser or Cys;

(l) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 110, wherein X at position 186 of SEQ ID NO: 110 is Ser or Cys;

(m) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 113, wherein X at position 186 of SEQ ID NO: 113 is Ser or Cys;

(n) both (a) and (c); both (a) and (g); both (b) and (c); both (b) and (g); both (d) and (f); both (d) and (h); both (e) and (f); or both (e) and (h);

(o) both (i) and (j); both (i) and (k); both (i) and (l); or both (i) and (m);

(p) an α chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 55, wherein:

(i) X at position 160 of SEQ ID NO: 55 is Thr or Cys;

(ii) X at position 224 of SEQ ID NO: 55 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 226 of SEQ ID NO: 55 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 227 of SEQ ID NO: 55 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(q) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 56, wherein X at position 173 of SEQ ID NO: 56 is Ser or Cys;

(r) an α chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 93, wherein:

(i) X at position 159 of SEQ ID NO: 93 is Thr or Cys;

(ii) X at position 223 of SEQ ID NO: 93 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 225 of SEQ ID NO: 93 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 226 of SEQ ID NO: 93 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(s) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 94, wherein X at position 177 of SEQ ID NO: 94 is Ser or Cys;

(t) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 99, wherein X at position 172 of SEQ ID NO: 99 is Ser or Cys;

(u) an α chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 57, wherein:

(i) X at position 159 of SEQ ID NO: 57 is Thr or Cys;

(ii) X at position 223 of SEQ ID NO: 57 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 225 of SEQ ID NO: 57 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 226 of SEQ ID NO: 57 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(v) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 58, wherein X at position 172 of SEQ ID NO: 58 is Ser or Cys;

(w) an α chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 116, wherein:

(i) X at position 158 of SEQ ID NO: 116 is Thr or Cys;

(ii) X at position 222 of SEQ ID NO: 116 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 224 of SEQ ID NO: 116 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 225 of SEQ ID NO: 116 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(x) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 117, wherein X at position 176 of SEQ ID NO: 117 is Ser or Cys;

(y) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 122, wherein X at position 171 of SEQ ID NO: 122 is Ser or Cys;

(z) both (p) and (q); both (r) and (s); or both (r) and (t);

(aa) both (u) and (v); both (w) and (x); or both (w) and (y);

(bb) an α chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 23;

(cc) an α chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 133;

(dd) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 24;

(ee) an α chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 83;

(ff) an α chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 136;

(gg) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 84;

(hh) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 87;

(ii) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 90;

(jj) an α chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 77;

(kk) an α chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 132;

(ll) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 78;

(mm) an α chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 81;

(nn) an α chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 135;

(oo) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 82;

(pp) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 86;

(qq) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 89;

(rr) an α chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 39;

(ss) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 40;

(tt) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 107;

(uu) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 112;

(vv) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 115;

(www) an α chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 103;

(xxx) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 104;

(yyy) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 106;

(zzz) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 111;

(aaa) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 114;

(bbb) both of (bb) and (dd); both of (cc) and (dd); both of (ee) and (gg); both of (ff) and (gg); both of (bb) and (hh); both of (cc) and (hh); both of (ee) and (ii); or both of (ff) and (ii);

(ccc) both of (jj) and (ll); both of (kk) and (ll); both of (mm) and (oo); both of (nn) and (oo); both of (jj) and (pp); both of (kk) and (pp); both of (mm) and (qq); or both of (nn) and (qq);

(ddd) both of (rr) and (ss); both of (rr) and (tt); both of (rr) and (uu); or both of (rr) and (vv);

(eee) both of (ww) and (xx) both of (ww) and (yy); both of (ww) and (zz); or both of (ww) and (aaa);

(fff) an α chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 51;

(ggg) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 52;

(hhh) an α chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 97;

(iii) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 98;

(jjj) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 101;

(kkk) an α chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 91;

(lll) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 92;

(mmm) an α chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 95;

(nnn) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 96;

(ooo) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 100;

(ppp) an α chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 53;

(qqq) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 54;

(rrr) an a chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 120;

(sss) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 121;

(ttt) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 124;

(uuu) an α chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 108;

(vvv) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 109;

(www) an a chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 118;

(xxx) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 119;

(yyy) a β chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 123;

(zzz) both of (fff) and (ggg); both of (hhh) and (iii); or both of (hhh) and (jjj);

(aaaa) both of (kkk) and (lll); both of (mmm) and (nnn); or both of (mmm) and (ooo);

(bbbb) both of (ppp) and (qqq); both of (rrr) and (sss); or both of (rrr) and (ttt) or

(cccc) both of (uuu) and (vvv); both of (www) and (xxx); or both of (www) and (yyy).

9.~~19.~~ The isolated or purified polypeptide of any one of ~~claims 13-17~~ claims 6-8, comprising:

(a) an α chain comprising the amino acid sequence of SEQ ID NO: 21, wherein:

(i) X at position 179 of SEQ ID NO: 21 is Thr or Cys;

(ii) X at position 243 of SEQ ID NO: 21 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 245 of SEQ ID NO: 21 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 246 of SEQ ID NO: 21 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(b) an α chain comprising the amino acid sequence of SEQ ID NO: 131, wherein:

(i) X at position 180 of SEQ ID NO: 131 is Thr or Cys;

(ii) X at position 244 of SEQ ID NO: 131 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 246 of SEQ ID NO: 131 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 247 of SEQ ID NO: 131 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(c) a β chain comprising the amino acid sequence of SEQ ID NO: 22, wherein X at position 198 of SEQ ID NO: 22 is Ser or Cys;

(d) an α chain comprising the amino acid sequence of SEQ ID NO: 79, wherein:

(i) X at position 179 of SEQ ID NO: 79 is Thr or Cys;

(ii) X at position 243 of SEQ ID NO: 79 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 245 of SEQ ID NO: 79 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 246 of SEQ ID NO: 79 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(e) an α chain comprising the amino acid sequence of SEQ ID NO: 134, wherein:

(i) X at position 180 of SEQ ID NO: 134 is Thr or Cys;

(ii) X at position 244 of SEQ ID NO: 134 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 246 of SEQ ID NO: 134 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 247 of SEQ ID NO: 134 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(f) a β chain comprising the amino acid sequence of SEQ ID NO: 80, wherein X at position 198 of SEQ ID NO: 80 is Ser or Cys;

(g) a β chain comprising the amino acid sequence of SEQ ID NO: 85, wherein X at position 187 of SEQ ID NO: 85 is Ser or Cys;

(h) a β chain comprising the amino acid sequence of SEQ ID NO: 88, wherein X at position 187 of SEQ ID NO: 88 is Ser or Cys;

(i) an α chain comprising the amino acid sequence of SEQ ID NO: 41, wherein:

(i) X at position 179 of SEQ ID NO: 41 is Thr or Cys;

(ii) X at position 243 of SEQ ID NO: 41 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 245 of SEQ ID NO: 41 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 246 of SEQ ID NO: 41 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(j) a β chain comprising the amino acid sequence of SEQ ID NO: 42, wherein X at position 197 of SEQ ID NO: 42 is Ser or Cys;

(k) a β chain comprising the amino acid sequence of SEQ ID NO: 105, wherein X at position 197 of SEQ ID NO: 105 is Ser or Cys;

(l) a β chain comprising the amino acid sequence of SEQ ID NO: 110, wherein X at position 186 of SEQ ID NO: 110 is Ser or Cys;

(m) a β chain comprising the amino acid sequence of SEQ ID NO: 113, wherein X at position 186 of SEQ ID NO: 113 is Ser or Cys;

(n) both (a) and (c); both (a) and (g); both (b) and (c); both (b) and (g); both (d) and (f); both (d) and (h); both (e) and (f); or both (e) and (h);

(o) both (i) and (j); both (i) and (k); both (i) and (l); or both (i) and (m);

(p) an α chain comprising the amino acid sequence of SEQ ID NO: 55, wherein:

(i) X at position 160 of SEQ ID NO: 55 is Thr or Cys;

(ii) X at position 224 of SEQ ID NO: 55 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 226 of SEQ ID NO: 55 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 227 of SEQ ID NO: 55 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(q) a β chain comprising the amino acid sequence of SEQ ID NO: 56, wherein X at position 173 of SEQ ID NO: 56 is Ser or Cys;

(r) an α chain comprising the amino acid sequence of SEQ ID NO: 93, wherein:

(i) X at position 159 of SEQ ID NO: 93 is Thr or Cys;

(ii) X at position 223 of SEQ ID NO: 93 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 225 of SEQ ID NO: 93 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 226 of SEQ ID NO: 93 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(s) a β chain comprising the amino acid sequence of SEQ ID NO: 94, wherein X at position 177 of SEQ ID NO: 94 is Ser or Cys;

(t) a β chain comprising the amino acid sequence of SEQ ID NO: 99, wherein X at position 172 of SEQ ID NO: 99 is Ser or Cys;

(u) an α chain comprising the amino acid sequence of SEQ ID NO: 57, wherein:

(i) X at position 159 of SEQ ID NO: 57 is Thr or Cys;

(ii) X at position 223 of SEQ ID NO: 57 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 225 of SEQ ID NO: 57 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 226 of SEQ ID NO: 57 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(v) a β chain comprising the amino acid sequence of SEQ ID NO: 58, wherein X at position 172 of SEQ ID NO: 58 is Ser or Cys;

(w) an α chain comprising the amino acid sequence of SEQ ID NO: 116, wherein:

(i) X at position 158 of SEQ ID NO: 116 is Thr or Cys;

(ii) X at position 222 of SEQ ID NO: 116 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 224 of SEQ ID NO: 116 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 225 of SEQ ID NO: 116 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(x) a β chain comprising the amino acid sequence of SEQ ID NO: 117, wherein X at position 176 of SEQ ID NO: 117 is Ser or Cys;

(y) a β chain comprising the amino acid sequence of SEQ ID NO: 122, wherein X at position 171 of SEQ ID NO: 122 is Ser or Cys;

(z) both (p) and (q); both (r) and (s); or both (r) and (t);

(aa) both (u) and (v); both (w) and (x); or both (w) and (y);

(bb) an α chain comprising the amino acid sequence of SEQ ID NO: 23;

(cc) an α chain comprising the amino acid sequence of SEQ ID NO: 133;

(dd) a β chain comprising the amino acid sequence of SEQ ID NO: 24;

(ee) an α chain comprising the amino acid sequence of SEQ ID NO: 83;

(ff) an α chain comprising the amino acid sequence of SEQ ID NO: 136;

(gg) a β chain comprising the amino acid sequence of SEQ ID NO: 84;

(hh) a β chain comprising the amino acid sequence of SEQ ID NO: 87;

(ii) a β chain comprising the amino acid sequence of SEQ ID NO: 90;

(jj) an α chain comprising the amino acid sequence of SEQ ID NO: 77;

(kk) an α chain comprising the amino acid sequence of SEQ ID NO: 132;

(ll) a β chain comprising the amino acid sequence of SEQ ID NO: 78;

(mm) an α chain comprising the amino acid sequence of SEQ ID NO: 81;

(nn) an α chain comprising the amino acid sequence of SEQ ID NO: 135;

(oo) a β chain comprising the amino acid sequence of SEQ ID NO: 82;

(pp) a β chain comprising the amino acid sequence of SEQ ID NO: 86;

(qq) a β chain comprising the amino acid sequence of SEQ ID NO: 89;

(rr) an α chain comprising the amino acid sequence of SEQ ID NO: 39;

(ss) a β chain comprising the amino acid sequence of SEQ ID NO: 40;

(tt) a β chain comprising the amino acid sequence of SEQ ID NO: 107;

(uu) a β chain comprising the amino acid sequence of SEQ ID NO: 112;

(vv) a β chain comprising the amino acid sequence of SEQ ID NO: 115;

(ww) an α chain comprising the amino acid sequence of SEQ ID NO: 103;

(xx) a β chain comprising the amino acid sequence of SEQ ID NO: 104;

(yy) a β chain comprising the amino acid sequence of SEQ ID NO: 106;

(zz) a β chain comprising the amino acid sequence of SEQ ID NO: 111;

(aaa) a β chain comprising the amino acid sequence of SEQ ID NO: 114;

(bbb) both of (bb) and (dd); both of (cc) and (dd); both of (ee) and (gg); both of (ff) and (gg); both of (bb) and (hh); both of (cc) and (hh); both of (ee) and (ii); or both of (ff) and (ii);

(ccc) both of (jj) and (ll); both of (kk) and (ll); both of (mm) and (oo); both of (nn) and (oo); both of (jj) and (pp); both of (kk) and (pp); both of (mm) and (qq); or both of (nn) and (qq);

(ddd) both of (rr) and (ss); both of (rr) and (tt); both of (rr) and (uu); or both of (rr) and (vv);

(eee) both of (ww) and (xx) both of (ww) and (yy); both of (ww) and (zz); or both of (ww) and (aaa);

(fff) an α chain comprising the amino acid sequence of SEQ ID NO: 51;

(ggg) a β chain comprising the amino acid sequence of SEQ ID NO: 52;

(hhh) an α chain comprising the amino acid sequence of SEQ ID NO: 97;

(iii) a β chain comprising the amino acid sequence of SEQ ID NO: 98;

(jjj) a β chain comprising the amino acid sequence of SEQ ID NO: 101;

(kkk) an α chain comprising the amino acid sequence of SEQ ID NO: 91;

(lll) a β chain comprising the amino acid sequence of SEQ ID NO: 92;

(mmm) an α chain comprising the amino acid sequence of SEQ ID NO: 95;

(nnn) a β chain comprising the amino acid sequence of SEQ ID NO: 96;

(ooo) a β chain comprising the amino acid sequence of SEQ ID NO: 100;

(ppp) an α chain comprising the amino acid sequence of SEQ ID NO: 53;

(qqq) a β chain comprising the amino acid sequence of SEQ ID NO: 54;

(rrr) an a chain comprising the amino acid sequence of SEQ ID NO: 120;

(sss) a β chain comprising the amino acid sequence of SEQ ID NO: 121;

(ttt) a β chain comprising the amino acid sequence of SEQ ID NO: 124;

(uuu) an α chain comprising the amino acid sequence of SEQ ID NO: 108;
(vvv) a β chain comprising the amino acid sequence of SEQ ID NO: 109;
(www) an a chain comprising the amino acid sequence of SEQ ID NO: 118;
(xxx) a β chain comprising the amino acid sequence of SEQ ID NO: 119;
(yyy) a β chain comprising the amino acid sequence of SEQ ID NO: 123;
(zzz) both of (fff) and (ggg); both of (hhh) and (iii); or both of (hhh) and (jjj);
(aaaa) both of (kkk) and (lll); both of (mmm) and (nnn); or both of (mmm) and (ooo);
(bbbb) both of (ppp) and (qqq); both of (rrr) and (sss); or both of (rrr) and (ttt) or
(cccc) both of (uuu) and (vvv); both of (www) and (xxx); or both of (www) and (yyy).

10.~~20.~~ An isolated or purified protein comprising at least one of the polypeptides of any one of ~~claims 13-19~~ claims 6-9.

11.~~21.~~ The isolated or purified protein according to ~~claim 20~~ claim 10, comprising:

(a) a first polypeptide chain comprising the amino acid sequences of SEQ ID NOs: 1-3 and a second polypeptide chain comprising the amino acid sequences of SEQ ID NOs: 4-6; or

(b) a first polypeptide chain comprising the amino acid sequences of SEQ ID NOs: 31-33 and a second polypeptide chain comprising the amino acid sequences of SEQ ID NOs: 34-36.

~~22. The isolated or purified protein according to claim 20 or 21, comprising:~~

~~(i) a first polypeptide chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 7 and a second polypeptide chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 8;~~

~~(ii) a first polypeptide chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 129 and a second polypeptide chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 8;~~

~~(iii) a first polypeptide chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 63 and a second polypeptide chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 8;~~

(iv) a first polypeptide chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 130 and a second polypeptide chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 8;

(v) a first polypeptide chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 7 and a second polypeptide chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 64;

(vi) a first polypeptide chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 129 and a second polypeptide chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 64;

(vii) a first polypeptide chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 63 and a second polypeptide chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 64;

(viii) a first polypeptide chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 130 and a second polypeptide chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 64;

(ix) a first polypeptide chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 7 and a second polypeptide chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 65;

(x) a first polypeptide chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 129 and a second polypeptide chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 65;

(xi) a first polypeptide chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 63 and a second polypeptide chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 65;

(xii) a first polypeptide chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 130 and a second polypeptide chain

comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 65;

(xiii) a first polypeptide chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 7 and a second polypeptide chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 66;

(xiv) a first polypeptide chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 129 and a second polypeptide chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 66;

(xv) a first polypeptide chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 63 and a second polypeptide chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 66;

(xvi) a first polypeptide chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 130 and a second polypeptide chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 66;

(xvii) a first polypeptide chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 37 and a second polypeptide chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 38;

(xviii) a first polypeptide chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NOs: 37 and a second polypeptide chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 69;

(xix) a first polypeptide chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 37 and a second polypeptide chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 70;

(xx) a first polypeptide chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 37 and a second polypeptide chain

~~comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 71;~~

~~(xxi) a first polypeptide chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 47 and a second polypeptide chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 48;~~

~~(xxii) a first polypeptide chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 67 and a second polypeptide chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 68;~~

~~(xxiii) a first polypeptide chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 67 and a second polypeptide chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 76;~~

~~(xxiv) a first polypeptide chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 49 and a second polypeptide chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 50;~~

~~(xxv) a first polypeptide chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 72 and a second polypeptide chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 73; or~~

~~(xxvi) a first polypeptide chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 72 and a second polypeptide chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 102.~~

12.~~23.~~ The isolated or purified protein according to ~~claim 20 or 21~~ claim 10 or 11, comprising:

(i) a first polypeptide chain comprising the amino acid sequence of SEQ ID NO: 7 and a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 8;

(ii) a first polypeptide chain comprising the amino acid sequence of SEQ ID NO: 129 and a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 8;

(iii) a first polypeptide chain comprising the amino acid sequence of SEQ ID NO: 63 and a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 8;

(iv) a first polypeptide chain comprising the amino acid sequence of SEQ ID NO: 130 and a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 8;

(v) a first polypeptide chain comprising the amino acid sequence of SEQ ID NO: 7 and a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 64;

(vi) a first polypeptide chain comprising the amino acid sequence of SEQ ID NO: 129 and a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 64;

(vii) a first polypeptide chain comprising the amino acid sequence of SEQ ID NO: 63 and a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 64;

(viii) a first polypeptide chain comprising the amino acid sequence of SEQ ID NO: 130 and a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 64;

(ix) a first polypeptide chain comprising the amino acid sequence of SEQ ID NO: 7 and a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 65;

(x) a first polypeptide chain comprising the amino acid sequence of SEQ ID NO: 129 and a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 65;

(xi) a first polypeptide chain comprising the amino acid sequence of SEQ ID NO: 63 and a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 65;

(xii) a first polypeptide chain comprising the amino acid sequence of SEQ ID NO: 130 and a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 65;

(xiii) a first polypeptide chain comprising the amino acid sequence of SEQ ID NO: 7 and a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 66;

(xiv) a first polypeptide chain comprising the amino acid sequence of SEQ ID NO: 129 and a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 66;

(xv) a first polypeptide chain comprising the amino acid sequence of SEQ ID NO: 63 and a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 66;

(xvi) a first polypeptide chain comprising the amino acid sequence of SEQ ID NO: 130 and a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 66;

(xvii) a first polypeptide chain comprising the amino acid sequence of SEQ ID NO: 37 and a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 38;

(xviii) a first polypeptide chain comprising the amino acid sequence of SEQ ID NOs: 37 and a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 69;

(xix) a first polypeptide chain comprising the amino acid sequence of SEQ ID NO: 37 and a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 70;

(xx) a first polypeptide chain comprising the amino acid sequence of SEQ ID NO: 37 and a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 71;

(xxi) a first polypeptide chain comprising the amino acid sequence of SEQ ID NO: 47 and a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 48;

(xxii) a first polypeptide chain comprising the amino acid sequence of SEQ ID NO: 67 and a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 68;

(xxiii) a first polypeptide chain comprising the amino acid sequence of SEQ ID NO: 67 and a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 76;

(xxiv) a first polypeptide chain comprising the amino acid sequence of SEQ ID NO: 49 and a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 50;

(xxv) a first polypeptide chain comprising the amino acid sequence of SEQ ID NO: 72 and a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 73; or

(xxvi) a first polypeptide chain comprising the amino acid sequence of SEQ ID NO: 72 and a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 102.

~~24. The isolated or purified protein of any one of claims 20-23, further comprising:~~

~~(a) a first polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 17, wherein:~~

~~(i) X at position 48 of SEQ ID NO: 17 is Thr or Cys;~~

~~(ii) X at position 112 of SEQ ID NO: 17 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;~~

~~(iii) X at position 114 of SEQ ID NO: 17 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and~~

~~(iv) X at position 115 of SEQ ID NO: 17 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;~~

(b) a second polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 18, wherein X at position 57 of SEQ ID NO: 18 is Ser or Cys; or

(c) both (a) and (b).

13.25. The isolated or purified protein of any one of claims 20-23 claims 10-12, further comprising:

(a) a first polypeptide chain comprising the amino acid sequence of SEQ ID NO: 17, wherein:

(i) X at position 48 of SEQ ID NO: 17 is Thr or Cys;

(ii) X at position 112 of SEQ ID NO: 17 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 114 of SEQ ID NO: 17 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 115 of SEQ ID NO: 17 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(b) a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 18, wherein X at position 57 of SEQ ID NO: 18 is Ser or Cys; or

(c) both (a) and (b).

26. The isolated or purified protein of any one of claims 20-25, comprising:

(a) a first polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 21, wherein:

(i) X at position 179 of SEQ ID NO: 21 is Thr or Cys;

(ii) X at position 243 of SEQ ID NO: 21 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 245 of SEQ ID NO: 21 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 246 of SEQ ID NO: 21 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(b) a first polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 131, wherein:

(i) X at position 180 of SEQ ID NO: 131 is Thr or Cys;

(ii) X at position 244 of SEQ ID NO: 131 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 246 of SEQ ID NO: 131 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 247 of SEQ ID NO: 131 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(c) a second polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 22, wherein X at position 198 of SEQ ID NO: 22 is Ser or Cys;

(d) a first polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 79, wherein:

(i) X at position 179 of SEQ ID NO: 79 is Thr or Cys;

(ii) X at position 243 of SEQ ID NO: 79 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 245 of SEQ ID NO: 79 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 246 of SEQ ID NO: 79 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(e) a first polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 134, wherein:

(i) X at position 180 of SEQ ID NO: 134 is Thr or Cys;

(ii) X at position 244 of SEQ ID NO: 134 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 246 of SEQ ID NO: 134 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 247 of SEQ ID NO: 134 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(f) a second polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 80, wherein X at position 198 of SEQ ID NO: 80 is Ser or Cys;

(g) a second polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 85, wherein X at position 187 of SEQ ID NO: 85 is Ser or Cys;

(h) a second polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 88, wherein X at position 187 of SEQ ID NO: 88 is Ser or Cys;

(i) a first polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 41, wherein:

(i) X at position 179 of SEQ ID NO: 41 is Thr or Cys;

(ii) X at position 243 of SEQ ID NO: 41 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 245 of SEQ ID NO: 41 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 246 of SEQ ID NO: 41 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(j) a second polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 42, wherein X at position 197 of SEQ ID NO: 42 is Ser or Cys;

(k) a second polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 105, wherein X at position 197 of SEQ ID NO: 105 is Ser or Cys;

(l) a second polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 110, wherein X at position 186 of SEQ ID NO: 110 is Ser or Cys;

(m) a second polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 113, wherein X at position 186 of SEQ ID NO: 113 is Ser or Cys;

(n) both (a) and (c); both (a) and (g); both (b) and (c); both (b) and (g); both (d) and (f); both (d) and (h); both (e) and (f); or both (e) and (h);

(o) both (i) and (j); both (i) and (k); both (i) and (l); or both (i) and (m);

(p) a first polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 55, wherein:

(i) X at position 160 of SEQ ID NO: 55 is Thr or Cys;

(ii) X at position 224 of SEQ ID NO: 55 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 226 of SEQ ID NO: 55 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 227 of SEQ ID NO: 55 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(q) a second polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 56, wherein X at position 173 of SEQ ID NO: 56 is Ser or Cys;

(r) a first polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 93, wherein:

(i) X at position 159 of SEQ ID NO: 93 is Thr or Cys;

(ii) X at position 223 of SEQ ID NO: 93 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 225 of SEQ ID NO: 93 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 226 of SEQ ID NO: 93 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(s) a second polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 94, wherein X at position 177 of SEQ ID NO: 94 is Ser or Cys;

(t) a second polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 99, wherein X at position 172 of SEQ ID NO: 99 is Ser or Cys;

(u) a first polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 57, wherein:

(i) X at position 159 of SEQ ID NO: 57 is Thr or Cys;

(ii) X at position 223 of SEQ ID NO: 57 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 225 of SEQ ID NO: 57 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 226 of SEQ ID NO: 57 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(v) a second polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 58, wherein X at position 172 of SEQ ID NO: 58 is Ser or Cys;

(w) a first polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 116, wherein:

(i) X at position 158 of SEQ ID NO: 116 is Thr or Cys;

(ii) X at position 222 of SEQ ID NO: 116 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 224 of SEQ ID NO: 116 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 225 of SEQ ID NO: 116 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(x) a second polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 117, wherein X at position 176 of SEQ ID NO: 117 is Ser or Cys;

(y) a second polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 122, wherein X at position 171 of SEQ ID NO: 122 is Ser or Cys;

(z) both (p) and (q); both (r) and (s); or both (r) and (t);

(aa) both (u) and (v); both (w) and (x); or both (w) and (y);

(bb) a first polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 23;

(cc) a first polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 133;

(dd) a second polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 24;

(ee) a first polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 83;

(ff) a first polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 136;

(gg) a second polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 84;

(hh) a second polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 87;

(ii) a second polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 90;

(jj) a first polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 77;

(kk) a first polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 132;

(ll) a second polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 78;

(mm) a first polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 81;

(nn) a first polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 135;

(oo) a second polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 82;

(pp) a second polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 86;

(qq) a second polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 89;

(rr) a first polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 39;

(ss) a second polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 40;

(tt) a second polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 107;

(uu) a second polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 112;

(vv) a second polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 115;

(www) a first polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 103;

(xxx) a second polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 104;

(yyy) a second polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 106;

(zzz) a second polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 111;

(aaaa) a second polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 114;

(bbbb) both of (bb) and (dd); both of (cc) and (dd); both of (ee) and (gg); both of (ff) and (gg); both of (bb) and (hh); both of (cc) and (hh); both of (ee) and (ii); or both of (ff) and (ii);

(cccc) both of (jj) and (ll); both of (kk) and (ll); both of (mm) and (oo); both of (nn) and (oo); both of (jj) and (pp); both of (kk) and (pp); both of (mm) and (qq); or both of (nn) and (qq);

(dddd) both of (rr) and (ss); both of (rr) and (tt); both of (rr) and (uu); or both of (rr) and (vv);

(eeee) both of (ww) and (xx) both of (ww) and (yy); both of (ww) and (zz); or both of (ww) and (aaa);

(ffff) a first polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 51;

(gggg) a second polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 52;

(hhhh) a first polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 97;

(iiii) a second polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 98;

(jjjj) a second polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 101;

(kkkk) a first polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 91;

(lll) a second polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 92;

(mmm) a first polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 95;

(nnn) a second polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 96;

(ooo) a second polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 100;

(ppp) a first polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 53;

(qqq) a second polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 54;

(rrr) a first polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 120;

(sss) a second polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 121;

(ttt) a second polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 124;

(uuu) a first polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 108;

(vvv) a second polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 109;

(www) a first polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 118;

(xxx) a second polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 119;

(yyy) a second polypeptide chain comprising an amino acid sequence 99% identical to the amino acid sequence of SEQ ID NO: 123;

(zzz) both of (fff) and (ggg); both of (hhh) and (iii); or both of (hhh) and (jjj);

(aaaa) both of (kkk) and (lll); both of (mmm) and (nnn); or both of (mmm) and (ooo);

(bbbb) both of (ppp) and (qqq); both of (rrr) and (sss); or both of (rrr) and (ttt) or

(cccc) both of (uuu) and (vvv); both of (www) and (xxx); or both of (www) and (yyy).

14.~~27.~~ The isolated or purified protein of any one of ~~claims 20-25~~ claims 10-13, comprising:

(a) a first polypeptide chain comprising the amino acid sequence of SEQ ID NO: 21, wherein:

(i) X at position 179 of SEQ ID NO: 21 is Thr or Cys;

(ii) X at position 243 of SEQ ID NO: 21 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 245 of SEQ ID NO: 21 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 246 of SEQ ID NO: 21 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(b) a first polypeptide chain comprising the amino acid sequence of SEQ ID NO: 131, wherein:

(i) X at position 180 of SEQ ID NO: 131 is Thr or Cys;

(ii) X at position 244 of SEQ ID NO: 131 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 246 of SEQ ID NO: 131 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 247 of SEQ ID NO: 131 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(c) a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 22, wherein X at position 198 of SEQ ID NO: 22 is Ser or Cys;

(d) a first polypeptide chain comprising the amino acid sequence of SEQ ID NO: 79, wherein:

(i) X at position 179 of SEQ ID NO: 79 is Thr or Cys;

(ii) X at position 243 of SEQ ID NO: 79 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 245 of SEQ ID NO: 79 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 246 of SEQ ID NO: 79 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(e) a first polypeptide chain comprising the amino acid sequence of SEQ ID NO: 134, wherein:

(i) X at position 180 of SEQ ID NO: 134 is Thr or Cys;

(ii) X at position 244 of SEQ ID NO: 134 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 246 of SEQ ID NO: 134 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 247 of SEQ ID NO: 134 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(f) a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 80, wherein X at position 198 of SEQ ID NO: 80 is Ser or Cys;

(g) a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 85, wherein X at position 187 of SEQ ID NO: 85 is Ser or Cys;

(h) a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 88, wherein X at position 187 of SEQ ID NO: 88 is Ser or Cys;

(i) a first polypeptide chain comprising the amino acid sequence of SEQ ID NO: 41, wherein:

(i) X at position 179 of SEQ ID NO: 41 is Thr or Cys;

(ii) X at position 243 of SEQ ID NO: 41 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 245 of SEQ ID NO: 41 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 246 of SEQ ID NO: 41 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(j) a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 42, wherein X at position 197 of SEQ ID NO: 42 is Ser or Cys;

(k) a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 105, wherein X at position 197 of SEQ ID NO: 105 is Ser or Cys;

(l) a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 110, wherein X at position 186 of SEQ ID NO: 110 is Ser or Cys;

(m) a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 113, wherein X at position 186 of SEQ ID NO: 113 is Ser or Cys;

(n) both (a) and (c); both (a) and (g); both (b) and (c); both (b) and (g); both (d) and (f); both (d) and (h); both (e) and (f); or both (e) and (h);

(o) both (i) and (j); both (i) and (k); both (i) and (l); or both (i) and (m);

(p) a first polypeptide chain comprising the amino acid sequence of SEQ ID NO: 55, wherein:

(i) X at position 160 of SEQ ID NO: 55 is Thr or Cys;

(ii) X at position 224 of SEQ ID NO: 55 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 226 of SEQ ID NO: 55 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 227 of SEQ ID NO: 55 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(q) a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 56, wherein X at position 173 of SEQ ID NO: 56 is Ser or Cys;

(r) a first polypeptide chain comprising the amino acid sequence of SEQ ID NO: 93, wherein:

(i) X at position 159 of SEQ ID NO: 93 is Thr or Cys;

(ii) X at position 223 of SEQ ID NO: 93 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 225 of SEQ ID NO: 93 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 226 of SEQ ID NO: 93 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(s) a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 94, wherein X at position 177 of SEQ ID NO: 94 is Ser or Cys;

(t) a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 99, wherein X at position 172 of SEQ ID NO: 99 is Ser or Cys;

(u) a first polypeptide chain comprising the amino acid sequence of SEQ ID NO: 57, wherein:

(i) X at position 159 of SEQ ID NO: 57 is Thr or Cys;

(ii) X at position 223 of SEQ ID NO: 57 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 225 of SEQ ID NO: 57 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 226 of SEQ ID NO: 57 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(v) a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 58, wherein X at position 172 of SEQ ID NO: 58 is Ser or Cys;

(w) a first polypeptide chain comprising the amino acid sequence of SEQ ID NO: 116, wherein:

(i) X at position 158 of SEQ ID NO: 116 is Thr or Cys;

(ii) X at position 222 of SEQ ID NO: 116 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 224 of SEQ ID NO: 116 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 225 of SEQ ID NO: 116 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(x) a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 117, wherein X at position 176 of SEQ ID NO: 117 is Ser or Cys;

(y) a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 122, wherein X at position 171 of SEQ ID NO: 122 is Ser or Cys;

(z) both (p) and (q); both (r) and (s); or both (r) and (t);

(aa) both (u) and (v); both (w) and (x); or both (w) and (y);

(bb) a first polypeptide chain comprising the amino acid sequence of SEQ ID NO: 23;

(cc) a first polypeptide chain comprising the amino acid sequence of SEQ ID NO: 133;

(dd) a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 24;

(ee) a first polypeptide chain comprising the amino acid sequence of SEQ ID NO: 83;

(ff) a first polypeptide chain comprising the amino acid sequence of SEQ ID NO: 136;

(gg) a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 84;

(hh) a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 87;

(ii) a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 90;

(jj) a first polypeptide chain comprising the amino acid sequence of SEQ ID NO: 77;

(kk) a first polypeptide chain comprising the amino acid sequence of SEQ ID NO: 132;

(ll) a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 78;

(mm) a first polypeptide chain comprising the amino acid sequence of SEQ ID NO: 81;

(nn) a first polypeptide chain comprising the amino acid sequence of SEQ ID NO: 135;

(oo) a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 82;

(pp) a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 86;

(qq) a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 89;

(rr) a first polypeptide chain comprising the amino acid sequence of SEQ ID NO: 39;

(ss) a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 40;

(tt) a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 107;

(uu) a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 112;

(vv) a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 115;

(ww) a first polypeptide chain comprising the amino acid sequence of SEQ ID NO: 103;

(xx) a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 104;

(yy) a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 106;

(zz) a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 111;

(aaa) a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 114;

(bbb) both of (bb) and (dd); both of (cc) and (dd); both of (ee) and (gg); both of (ff) and (gg); both of (bb) and (hh); both of (cc) and (hh); both of (ee) and (ii); or both of (ff) and (ii);

(ccc) both of (jj) and (ll); both of (kk) and (ll); both of (mm) and (oo); both of (nn) and (oo); both of (jj) and (pp); both of (kk) and (pp); both of (mm) and (qq); or both of (nn) and (qq);

(ddd) both of (rr) and (ss); both of (rr) and (tt); both of (rr) and (uu); or both of (rr) and (vv);

(eee) both of (ww) and (xx) both of (ww) and (yy); both of (ww) and (zz); or both of (ww) and (aaa);

(fff) a first polypeptide chain comprising the amino acid sequence of SEQ ID NO: 51;

(ggg) a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 52;

(hhh) a first polypeptide chain comprising the amino acid sequence of SEQ ID NO: 97;

(iii) a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 98;

(jjj) a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 101;

(kkk) a first polypeptide chain comprising the amino acid sequence of SEQ ID NO: 91;

(lll) a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 92;

(mmm) a first polypeptide chain comprising the amino acid sequence of SEQ ID NO: 95;

(nnn) a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 96;

(ooo) a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 100;

(ppp) a first polypeptide chain comprising the amino acid sequence of SEQ ID NO: 53;

(qqq) a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 54;

(rrr) a first polypeptide chain comprising the amino acid sequence of SEQ ID NO: 120;

(sss) a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 121;

(ttt) a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 124;

(uuu) a first polypeptide chain comprising the amino acid sequence of SEQ ID NO: 108;

(vvv) a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 109;

(www) a first polypeptide chain comprising the amino acid sequence of SEQ ID NO: 118;

(xxx) a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 119;

(yyy) a second polypeptide chain comprising the amino acid sequence of SEQ ID NO: 123;

(zzz) both of (fff) and (ggg); both of (hhh) and (iii); or both of (hhh) and (jjj);

(aaaa) both of (kkk) and (lll); both of (mmm) and (nnn); or both of (mmm) and (ooo);

(bbbb) both of (ppp) and (qqq); both of (rrr) and (sss); or both of (rrr) and (ttt) or

(cccc) both of (uuu) and (vvv); both of (www) and (xxx); or both of (www) and (yyy).

15.~~28~~ An isolated or purified nucleic acid comprising a nucleotide sequence encoding the TCR according to any one of ~~claims 1-12~~ claims 1-5, the polypeptide according to any one of ~~claims 13-19~~ claims 6-9, or the protein according to any one of ~~claims 20-27~~ claims 10-14.

16.~~29.~~ An isolated or purified nucleic acid comprising, from 5’ to 3’, a first nucleic acid sequence and a second nucleotide sequence, wherein the first and second nucleotide sequence, respectively, encode the amino sequences of SEQ ID NOs: 7 and 8; 7 and 64; 63 and 8; 63 and 64; 7 and 65; 63 and 65; 7 and 66; 63 and 66; 8 and 7; 64 and 7; 8 and 63; 64 and 63; 65 and 7; 65 and 63; 66 and 7; 66 and 63; 129 and 8; 129 and 64; 129 and 65; 129 and 66; 8 and 129; 64 and 129; 65 and 129; 66 and 129; 130 and 8; 130 and 64; 130 and 65; 130 and 66; 8 and 130; 64 and 130; 65 and 130; 66 and 130; 37 and 38; 37 and 69; 37 and 70; 37 and 71; 38 and 37; 69 and 37; 70 and 37; 71 and 37; 23 and 24; 23 and 84; 83 and 24; 83 and 84; 23 and 87; 83 and 87; 23 and 90; 83 and 90; 24 and 23; 84 and 23; 24 and 83; 84 and 83; 87 and 23; 87 and 83; 90 and 23; 90 and 83; 133 and 24; 133 and 84; 133 and 87; 133 and 90; 24 and 133; 84 and 133; 87 and 133; 90 and 133; 39 and 40; 39 and 107; 39 and 112; 39 and 115; 40 and 39; 107 and 39; 112 and 39; 115 and 39; 136 and 24; 136 and 84; 136 and 87; 136 and 90; 24 and 136; 84 and 136; 87 and 136; 90 and 136; 21 and 22; 21 and 80; 79 and 22; 79 and 80; 21 and 85; 21 and 88; 79 and 85; 79 and 88; 22 and 21; 80 and 21; 22 and 79; 80 and 79; 85 and 21; 88 and 21; 85 and 79; 88 and 79; 131 and 22; 131 and 80; 131 and 85; 131 and 88; 22 and 131; 80 and 131; 85 and 131; 88 and 131; 134 and 22; 134 and 80; 134 and 85; 134 and 88; 22 and 134; 80 and 134; 85 and 134; 88 and 134; 77 and 78; 77 and 82; 81 and 78; 81 and 82; 77 and 86; 81 and 86; 78 and 77; 82 and 77; 78 and 81; 82 and 81; 86 and 77; 86 and 81; 132 and 78; 132 and 82; 132 and 86; 78 and 132; 82 and 132; 86 and 132; 135 and 78; 135 and 82; 135 and 86; 78 and 135; 82 and 135; 86 and 135; 77 and 89; 81 and 89; 89 and 77; 89 and 81; 132 and 89; 89 and 132; 135 and 89; 89 and 135; 41 and 42; 41 and 105; 41 and 110; 41 and 113; 42 and 41; 105 and 41; 110 and 41; 113 and 41; 103 and 104; 103 and 111; 103 and 114; 104 and 103; 111 and 103; 114 and 103; 103 and 106; 106 and 103; 47 and 48; 48 and 47; 67 and 68; 67 and 76; 68 and 67; 76 and 67; 49 and 50; 50 and 49; 72 and 73; 72 and 102; 73 and 72; 102 and 72; 51 and 52; 52 and 51; 53 and 54; 54 and 53; 55 and 56; 56 and 55; 57 and 58; 58 and 57; 91 and 92; 92 and 91; 108 and 109; 109 and 108; 93 and 94; 93 and 99; 94 and 93; 99 and 93; 97 and 98; 97 and 101; 98 and 97; 101 and 97; 95 and 96; 95 and 100; 96 and 95; 100 and 95; 116 and 117; 116 and 122; 117 and 116; 122 and 116; 120 and 121; 120 and 124; 121 and 120; 124 and 120; 118 and 119; 118 and 123; 119 and 118 or 123 and 118.

30. The isolated or purified nucleic acid according to claim 29, further comprising a third nucleotide sequence interposed between the first and second nucleotide sequence, wherein the third nucleotide sequence encodes a cleavable linker peptide.

31. The isolated or purified nucleic acid according to claim 30, wherein the cleavable linker peptide comprises the amino acid sequence of SEQ ID NO: 25.

17.32. A recombinant expression vector comprising the nucleic acid according to any one of claims 28-31 claim 15 or 16.

18.33. The recombinant expression vector according to claim 32 claim 17, which is a transposon or a lentiviral vector.

19.34. An isolated or purified TCR, polypeptide, or protein encoded by the nucleic acid according to any one of claims 28-31 claim 15 or 16 or the vector according to claim 32 or 33 claim 17 or 18.

35. An isolated or purified TCR, polypeptide, or protein that results from expression of the nucleic acid according to any one of claims 28-31 or the vector according to claim 32 or 33 in a cell.

36. A method of producing a host cell expressing a TCR that has antigenic specificity for the peptide of SEQ ID NO: 30, the method comprising contacting a cell with the vector according to claim 32 or 33 under conditions that allow introduction of the vector into the cell.

20.37. An isolated or purified host cell comprising the nucleic acid according to any one of claims 28-31 claim 15 or 16 or the recombinant expression vector according to claim 32 or 33 claim 17 or 18.

38. The host cell according to claim 37 wherein the cell is a human lymphocyte.

21.~~39.~~ The host cell according to ~~claim 37 or 38~~ claim 20, wherein the cell is selected from the group consisting of a T cell, a natural killer T (NKT) cell, an invariant natural killer T (iNKT) cell, and a natural killer (NK) cell.

22.~~40.~~ An isolated or purified population of cells comprising the host cell according to ~~any one of claims 37-39~~ claim 20 or 21.

~~41. A method of producing the TCR according to any one of claims 1-12, 34, or 35, the polypeptide according to any one of claims 13-19, 34, or 35, or the protein according to any one of claims 20-27, 34, or 35, the method comprising culturing the host cell according to any one of claims 37-39, or the population of host cells according to claim 40, so that the TCR, polypeptide, or protein is produced.~~

23.~~42.~~ A pharmaceutical composition comprising (a) the TCR according to any one of ~~claims 1-12, 34, or 35~~ claims 1-5 or 19, the polypeptide according to any one of ~~claims 13-19, 34, or 35~~ claims 6-9 or 19, or the protein according to any one of ~~claims 20-27, 34, or 35~~ claims 10-14 or 19, the nucleic acid according to any one of ~~claims 28-31~~ claim 15 or 16, the recombinant expression vector according to ~~claim 32 or 33~~ claim 17 or 18, the host cell according to ~~any one of claims 37-39~~ claim 20 or 21, or the population of cells according to ~~claim 40~~ claim 22 and (b) a pharmaceutically acceptable carrier.

~~43. A method of detecting the presence of cancer in mammal, the method comprising:~~

~~(a) contacting a sample comprising cells of the cancer with the TCR according to any one of claims 1-12, 34, or 35, the polypeptide according to any one of claims 13-19, 34, or 35, or the protein according to any one of claims 20-27, 34, or 35, the nucleic acid according to any one of claims 28-31, the recombinant expression vector according to claim 32 or 33, the host cell according to any one of claims 37-39, the population of cells according to claim 40, or the pharmaceutical composition of claim 42, thereby forming a complex; and~~

~~(b) detecting the complex,~~

~~wherein detection of the complex is indicative of the presence of cancer in the mammal.~~

~~44. The TCR according to any one of claims 1-12, 34, or 35, the polypeptide according to any one of claims 13-19, 34, or 35, or the protein according to any one of claims 20-27, 34, or 35, the nucleic acid according to any one of claims 28-31, the recombinant expression vector according to claim 32 or 33, the host cell according to any one of claims 37-39, the population of cells according to claim 40, or the pharmaceutical composition according to claim 42, for use in inducing an immune response against a cancer in a mammal.~~

24.~~45. The~~ Use of the TCR according to any one of ~~claims 1-12, 34, or 35~~ claims 1-5 or 19, the polypeptide according to any one of ~~claims 13-19, 34, or 35~~ claims 6-9 or 19, or the protein according to any one of ~~claims 20-27, 34, or 35~~ claims 10-14 or 19, the nucleic acid according to any one of ~~claims 28-31~~ claim 15 or 16, the recombinant expression vector according to ~~claim 32 or 33~~ claim 17 or 18, the host cell according to ~~any one of claims 37-39~~ claim 20 or 21, the population of cells according to ~~claim 40~~ claim 22, or the pharmaceutical composition of ~~claim 42~~ claim 23, ~~for use~~ in the manufacture of a medicament for the detection, treatment and prevention of ~~treating or preventing~~ cancer in a mammal.

25.~~46.~~ The ~~method~~ use according to claim 24 ~~claim 43 or the TCR, polypeptide, protein, nucleic acid, recombinant expression vector, host cell, population of cells, or pharmaceutical composition for the use of claim 44 or 45~~, wherein the cancer expresses a mutated human RAS amino acid sequence with a substitution of glycine at position 12 with valine,

wherein the mutated human RAS amino acid sequence is a mutated human Kirsten rat sarcoma viral oncogene homolog (KRAS), a mutated human Harvey rat sarcoma viral oncogene homolog (HRAS), or a mutated human Neuroblastoma rat sarcoma viral oncogene homolog (NRAS) amino acid sequence, and

wherein position 12 is defined by reference to the wild-type human KRAS, wild-type human HRAS, or wild-type human NRAS protein, respectively.

~~47. The method of claim 43 or 46, or the TCR, polypeptide, protein, nucleic acid, recombinant expression vector, host cell, population of cells, or pharmaceutical composition for the use according to any one of claims 44-46, wherein the mutated human RAS amino~~

acid sequence is a mutated human Kirsten rat sarcoma viral oncogene homolog (KRAS) amino acid sequence.

48. The method of claim 43 or 46 or the TCR, polypeptide, protein, nucleic acid, recombinant expression vector, host cell, population of cells, or pharmaceutical composition for the use according toany one of claims 44-46, wherein the mutated human RAS amino acid sequence is a mutated human neuroblastoma rat sarcoma viral oncogene homolog (NRAS) amino acid sequence.

49. The method of claim 43 or 46 or the TCR, polypeptide, protein, nucleic acid, recombinant expression vector, host cell, population of cells, or pharmaceutical composition for the use according to any one of claims 44-46, wherein the mutated human RAS amino acid sequence is a mutated human Harvey rat sarcoma viral oncogene homolog (HRAS) amino acid sequence.

50. The method according to any one of claims 43 and 46-49 or the TCR, polypeptide, protein, nucleic acid, recombinant expression vector, host cell, population of cells, or pharmaceutical composition for the use according to any one of claims 44-49, wherein the cancer is pancreatic, colorectal, lung, endometrial, ovarian, or prostate cancer.