

CLAIMS:

1. An isolated or purified T-cell receptor (TCR) comprising all of the amino acid sequences of SEQ ID NOs: 1-3, 4-6, or 1-6, wherein the TCR has antigenic specificity for a mutated human RAS amino acid sequence with a substitution of glycine at position 12 with aspartic acid,

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.

2. The isolated or purified TCR according to claim 1, wherein the mutated human RAS amino acid sequence is VVVGADGVGK (SEQ ID NO: 29).

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 VVVGAGGVGK (SEQ ID NO: 31).

4. The isolated or purified TCR according to any one of claims 1-3, wherein the mutated human RAS amino acid sequence is presented by a human leukocyte antigen (HLA) Class I molecule.

5. The isolated or purified TCR according to claim 4, wherein the HLA Class I molecule is an HLA-A molecule.

6. The isolated or purified TCR according to claim 4, wherein the HLA Class I molecule is an HLA-A11 molecule.

7. The isolated or purified TCR according to claim 4, wherein the HLA Class I molecule is encoded by the HLA-A*11:01 allele.

8. The isolated or purified TCR according to any one of claims 1-7, comprising:
(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: 8;

(iii) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 51;

(iv) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 52;

(v) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 32;

(vi) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 33;

(vii) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 59;

(viii) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 60; or

(ix) both (i) and (ii), both (i) and (iv), both (ii) and (iii), both (iii) and (iv), both (v) and (vi), both (v) and (viii), both (vi) and (vii), or both (vii) and (viii).

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

(i) the amino acid sequence of SEQ ID NO: 7;

(ii) the amino acid sequence of SEQ ID NO: 8;

(iii) the amino acid sequence of SEQ ID NO: 51;

(iv) the amino acid sequence of SEQ ID NO: 52;

(v) the amino acid sequence of SEQ ID NO: 32;

(vi) the amino acid sequence of SEQ ID NO: 33;

(vii) the amino acid sequence of SEQ ID NO: 59;

(viii) the amino acid sequence of SEQ ID NO: 60; or
(ix) both (i) and (ii), both (i) and (iv), both (ii) and (iii), both (iii) and (iv), both (v) and (vi), both (v) and (viii), both (vi) and (vii), or both (vii) and (viii).

10. The isolated or purified TCR according to any one of claims 1-9, 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).

11. The isolated or purified TCR according to any one of claims 1-10, 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).

12. The isolated or purified TCR according to any one of claims 1-11, comprising:

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

(i) X at position 193 of SEQ ID NO: 21 is Thr or Cys;

(ii) X at position 257 of SEQ ID NO: 21 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 259 of SEQ ID NO: 21 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 260 of SEQ ID NO: 21 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(b) a β chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 22, wherein X at position 191 of SEQ ID NO: 22 is Ser or Cys;

(c) an α chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 53, wherein:

(i) X at position 193 of SEQ ID NO: 53 is Thr or Cys;

(ii) X at position 257 of SEQ ID NO: 53 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 259 of SEQ ID NO: 53 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 260 of SEQ ID NO: 53 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(d) a β chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 54, wherein X at position 191 of SEQ ID NO: 54 is Ser or Cys;

(e) both (a) and (b), both (a) and (d), both (b) and (c), or both (c) and (d);

(f) an α chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 34, wherein:

(i) X at position 165 of SEQ ID NO: 34 is Thr or Cys;

(ii) X at position 229 of SEQ ID NO: 34 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 231 of SEQ ID NO: 34 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 232 of SEQ ID NO: 34 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(g) a β chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 35, wherein X at position 172 of SEQ ID NO: 35 is Ser or Cys;

(h) an α chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 61, wherein:

(i) X at position 172 of SEQ ID NO: 61 is Thr or Cys;

(ii) X at position 236 of SEQ ID NO: 61 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 238 of SEQ ID NO: 61 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 239 of SEQ ID NO: 61 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(i) a β chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 62, wherein X at position 170 of SEQ ID NO: 62 is Ser or Cys;

(j) both (f) and (g), or both (h) and (i);

(k) an α chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 36;

(l) a β chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 37;

(m) an α chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 63;

- (n) a β chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 64;
- (o) an α chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 42;
- (p) a β chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 43;
- (q) an α chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 65;
- (r) a β chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 66;
- (s) both (k) and (l), both (m) and (n), both (o) and (p), or both (q) and (r);
- (t) an α chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 23;
- (u) a β chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 24;
- (v) an α chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 55;
- (w) a β chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 56;
- (x) an α chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 40;
- (y) a β chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 41;
- (z) an α chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 57;
- (aa) a β chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 58; or
- (ab) both (t) and (u), both (t) and (w), both (u) and (v), both (v) and (w), both (x) and (y), both (x) and (aa), both (y) and (z), or both (z) and (aa).

13. The isolated or purified TCR according to any one of claims 1-12, comprising:

- (a) an α chain comprising the amino acid sequence of SEQ ID NO: 21, wherein:
 - (i) X at position 193 of SEQ ID NO: 21 is Thr or Cys;
 - (ii) X at position 257 of SEQ ID NO: 21 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;
 - (iii) X at position 259 of SEQ ID NO: 21 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and
 - (iv) X at position 260 of SEQ ID NO: 21 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;
- (b) a β chain comprising the amino acid sequence of SEQ ID NO: 22, wherein X at position 191 of SEQ ID NO: 22 is Ser or Cys;
- (c) an α chain comprising the amino acid sequence of SEQ ID NO: 53, wherein:
 - (i) X at position 193 of SEQ ID NO: 21 is Thr or Cys;
 - (ii) X at position 257 of SEQ ID NO: 21 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;
 - (iii) X at position 259 of SEQ ID NO: 21 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and
 - (iv) X at position 260 of SEQ ID NO: 21 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;
- (d) a β chain comprising the amino acid sequence of SEQ ID NO: 54, wherein X at position 191 of SEQ ID NO: 54 is Ser or Cys;
- (e) both (a) and (b), both (a) and (d), both (b) and (c), or both (c) and (d);
- (f) an α chain comprising the amino acid sequence of SEQ ID NO: 34, wherein:
 - (i) X at position 165 of SEQ ID NO: 34 is Thr or Cys;
 - (ii) X at position 229 of SEQ ID NO: 34 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;
 - (iii) X at position 231 of SEQ ID NO: 34 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and
 - (iv) X at position 232 of SEQ ID NO: 34 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;
- (g) a β chain comprising the amino acid sequence of SEQ ID NO: 35, wherein X at position 172 of SEQ ID NO: 35 is Ser or Cys;

- (h) an α chain comprising the amino acid sequence of SEQ ID NO: 61, wherein:
 - (i) X at position 172 of SEQ ID NO: 61 is Thr or Cys;
 - (ii) X at position 236 of SEQ ID NO: 61 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;
 - (iii) X at position 238 of SEQ ID NO: 61 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and
 - (iv) X at position 239 of SEQ ID NO: 61 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;
- (i) a β chain comprising the amino acid sequence of SEQ ID NO: 62, wherein X at position 170 of SEQ ID NO: 62 is Ser or Cys;
- (j) both (f) and (g), or both (h) and (i);
- (k) an α chain comprising the amino acid sequence of SEQ ID NO: 36;
- (l) a β chain comprising the amino acid sequence of SEQ ID NO: 37;
- (m) an α chain comprising the amino acid sequence of SEQ ID NO: 63;
- (n) a β chain comprising the amino acid sequence of SEQ ID NO: 64;
- (o) an α chain comprising the amino acid sequence of SEQ ID NO: 42;
- (p) a β chain comprising the amino acid sequence of SEQ ID NO: 43;
- (q) an α chain comprising the amino acid sequence of SEQ ID NO: 65;
- (r) a β chain comprising the amino acid sequence of SEQ ID NO: 66;
- (s) both (k) and (l), both (m) and (n), both (o) and (p), or both (q) and (r);
- (t) an α chain comprising the amino acid sequence of SEQ ID NO: 23;
- (u) a β chain comprising the amino acid sequence of SEQ ID NO: 24;
- (v) an α chain comprising the amino acid sequence of SEQ ID NO: 55;
- (w) a β chain comprising the amino acid sequence of SEQ ID NO: 56;
- (x) an α chain comprising the amino acid sequence of SEQ ID NO: 40;
- (y) a β chain comprising the amino acid sequence of SEQ ID NO: 41;
- (z) an α chain comprising the amino acid sequence of SEQ ID NO: 57;
- (aa) a β chain comprising the amino acid sequence of SEQ ID NO: 58; or
- (ab) both (t) and (u), both (t) and (w), both (u) and (v), both (v) and (w), both (x) and (y), both (x) and (aa), both (y) and (z), or both (z) and (aa).

14. An isolated or purified polypeptide comprising a functional portion of the TCR according to any one of claims 1-13, 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, or
- (c) all of SEQ ID NOs: 1-6.

15. The isolated or purified polypeptide according to claim 14, wherein the functional portion comprises:

- (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: 8;
- (iii) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 51;
- (iv) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 52;
- (v) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 32;
- (vi) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 33;
- (vii) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 59;
- (viii) an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 60; or
- (ix) both (i) and (ii), both (i) and (iv), both (ii) and (iii), both (iii) and (iv), both (v) and (vi), both (v) and (viii), both (vi) and (vii), or both (vii) and (viii).

16. The isolated or purified polypeptide according to claim 14 or 15, wherein the functional portion comprises the amino acid sequence(s) of:

- (i) SEQ ID NO: 7;

- (ii) SEQ ID NO: 8;
- (iii) SEQ ID NO: 51;
- (iv) SEQ ID NO: 52;
- (v) SEQ ID NO: 32;
- (vi) SEQ ID NO: 33;
- (vii) SEQ ID NO: 59;
- (viii) SEQ ID NO: 60; or
- (ix) both (i) and (ii), both (i) and (iv), both (ii) and (iii), both (iii) and (iv), both (v) and (vi), both (v) and (viii), both (vi) and (vii), or both (vii) and (viii).

17. The isolated or purified polypeptide according to any one of claims 14-16, 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).

18. The isolated or purified polypeptide according to any one of claims 14-17, 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).

19. The isolated or purified polypeptide according to any one of claims 14-18, comprising:

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

(i) X at position 193 of SEQ ID NO: 21 is Thr or Cys;

(ii) X at position 257 of SEQ ID NO: 21 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 259 of SEQ ID NO: 21 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 260 of SEQ ID NO: 21 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(b) a β chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 22, wherein X at position 191 of SEQ ID NO: 22 is Ser or Cys;

(c) an α chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 53, wherein:

(i) X at position 193 of SEQ ID NO: 53 is Thr or Cys;

(ii) X at position 257 of SEQ ID NO: 53 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 259 of SEQ ID NO: 53 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 260 of SEQ ID NO: 53 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(d) a β chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 54, wherein X at position 191 of SEQ ID NO: 54 is Ser or Cys;

(e) both (a) and (b), both (a) and (d), both (b) and (c), or both (c) and (d);

(f) an α chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 34, wherein:

(i) X at position 165 of SEQ ID NO: 34 is Thr or Cys;

(ii) X at position 229 of SEQ ID NO: 34 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 231 of SEQ ID NO: 34 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 232 of SEQ ID NO: 34 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(g) a β chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 35, wherein X at position 172 of SEQ ID NO: 35 is Ser or Cys;

(h) an α chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 61, wherein:

(i) X at position 172 of SEQ ID NO: 61 is Thr or Cys;

(ii) X at position 236 of SEQ ID NO: 61 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 238 of SEQ ID NO: 61 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 239 of SEQ ID NO: 61 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(i) a β chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 62, wherein X at position 170 of SEQ ID NO: 62 is Ser or Cys;

(j) both (f) and (g), or both (h) and (i);

(k) an α chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 36;

- (l) a β chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 37;
- (m) an α chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 63;
- (n) a β chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 64;
- (o) an α chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 42;
- (p) a β chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 43;
- (q) an α chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 65;
- (r) a β chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 66;
- (s) both (k) and (l), both (m) and (n), both (o) and (p), or both (q) and (r);
- (t) an α chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 23;
- (u) a β chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 24;
- (v) an α chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 55;
- (w) a β chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 56;
- (x) an α chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 40;
- (y) a β chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 41;
- (z) an α chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 57;
- (aa) a β chain comprising an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 58; or

(ab) both (t) and (u), both (t) and (w), both (u) and (v), both (v) and (w), both (x) and (y), both (x) and (aa), both (y) and (z), or both (z) and (aa).

20. The isolated or purified polypeptide according to any one of claims 14-19, comprising:

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

(i) X at position 193 of SEQ ID NO: 21 is Thr or Cys;

(ii) X at position 257 of SEQ ID NO: 21 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 259 of SEQ ID NO: 21 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 260 of SEQ ID NO: 21 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(b) a β chain comprising the amino acid sequence of SEQ ID NO: 22, wherein X at position 191 of SEQ ID NO: 22 is Ser or Cys;

(c) an α chain comprising the amino acid sequence of SEQ ID NO: 53, wherein:

(i) X at position 193 of SEQ ID NO: 53 is Thr or Cys;

(ii) X at position 257 of SEQ ID NO: 53 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 259 of SEQ ID NO: 53 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 260 of SEQ ID NO: 53 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(d) a β chain comprising the amino acid sequence of SEQ ID NO: 54, wherein X at position 191 of SEQ ID NO: 54 is Ser or Cys;

(e) both (a) and (b), both (a) and (d), both (b) and (c), or both (c) and (d);

(f) an α chain comprising the amino acid sequence of SEQ ID NO: 34, wherein:

(i) X at position 165 of SEQ ID NO: 34 is Thr or Cys;

(ii) X at position 229 of SEQ ID NO: 34 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

- (iii) X at position 231 of SEQ ID NO: 34 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and
- (iv) X at position 232 of SEQ ID NO: 34 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;
- (g) a β chain comprising the amino acid sequence of SEQ ID NO: 35, wherein X at position 172 of SEQ ID NO: 35 is Ser or Cys;
- (h) an α chain comprising the amino acid sequence of SEQ ID NO: 61, wherein:
 - (i) X at position 172 of SEQ ID NO: 61 is Thr or Cys;
 - (ii) X at position 236 of SEQ ID NO: 61 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;
 - (iii) X at position 238 of SEQ ID NO: 61 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and
 - (iv) X at position 239 of SEQ ID NO: 61 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;
- (i) a β chain comprising the amino acid sequence of SEQ ID NO: 62, wherein X at position 170 of SEQ ID NO: 62 is Ser or Cys;
- (j) both (f) and (g), or both (h) and (i);
- (k) an α chain comprising the amino acid sequence of SEQ ID NO: 36;
- (l) a β chain comprising the amino acid sequence of SEQ ID NO: 37;
- (m) an α chain comprising the amino acid sequence of SEQ ID NO: 63;
- (n) a β chain comprising the amino acid sequence of SEQ ID NO: 64;
- (o) an α chain comprising the amino acid sequence of SEQ ID NO: 42;
- (p) a β chain comprising the amino acid sequence of SEQ ID NO: 43;
- (q) an α chain comprising the amino acid sequence of SEQ ID NO: 65;
- (r) a β chain comprising the amino acid sequence of SEQ ID NO: 66;
- (s) both (k) and (l), both (m) and (n), both (o) and (p), or both (q) and (r);
- (t) an α chain comprising the amino acid sequence of SEQ ID NO: 23;
- (u) a β chain comprising the amino acid sequence of SEQ ID NO: 24;
- (v) an α chain comprising the amino acid sequence of SEQ ID NO: 55;
- (w) a β chain comprising the amino acid sequence of SEQ ID NO: 56;
- (x) an α chain comprising the amino acid sequence of SEQ ID NO: 40;

(y) a β chain comprising the amino acid sequence of SEQ ID NO: 41;
(z) an α chain comprising the amino acid sequence of SEQ ID NO: 57;
(aa) a β chain comprising the amino acid sequence of SEQ ID NO: 58; or
(ab) both (t) and (u), both (t) and (w), both (u) and (v), both (v) and (w), both (x) and (y), both (x) and (aa), both (y) and (z), and both (z) and (aa).

21. An isolated or purified protein, comprising 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.

22. The isolated or purified protein according to claim 21, wherein

(i) the first polypeptide chain comprises an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 7;

(ii) the second polypeptide chain comprises an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 8;

(iii) the first polypeptide chain comprises an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 51;

(iv) the second polypeptide chain comprises an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 52;

(v) the first polypeptide chain comprises an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 32;

(vi) the second polypeptide chain comprises an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 33;

(vii) the first polypeptide chain comprises an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 59;

(viii) the second polypeptide chain comprises an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 60; or

(ix) both (i) and (ii), both (i) and (iv), both (ii) and (iii), both (iii) and (iv), both (v) and (vi), both (v) and (viii), both (vi) and (vii), or both (vii) and (viii).

23. The isolated or purified protein according to claim 21 or 22, wherein:

- (i) the first polypeptide chain comprises the amino acid sequence of SEQ ID NO: 7;
- (ii) the second polypeptide chain comprises the amino acid sequence of SEQ ID NO: 8;
- (iii) the first polypeptide chain comprises the amino acid sequence of SEQ ID NO: 51;
- (iv) the second polypeptide chain comprises the amino acid sequence of SEQ ID NO: 52;
- (v) the first polypeptide chain comprises the amino acid sequence of SEQ ID NO: 32;
- (vi) the second polypeptide chain comprises the amino acid sequence of SEQ ID NO: 33;
- (vii) the first polypeptide chain comprises the amino acid sequence of SEQ ID NO: 59;
- (viii) the second polypeptide chain comprises the amino acid sequence of SEQ ID NO: 60; or
- (ix) both (i) and (ii), both (i) and (iv), both (ii) and (iii), both (iii) and (iv), both (v) and (vi), both (v) and (viii), both (vi) and (vii), or both (vii) and (viii).

24. The isolated or purified protein according to any one of claims 21-23, wherein:

(a) the first polypeptide chain further comprises 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) the second polypeptide chain further comprises 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).

25. The isolated or purified protein according to any one of claims 21-24, wherein:

(a) the first polypeptide chain further comprises 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 second polypeptide chain further comprises 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 according to any one of claims 21-25, wherein:

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

(i) X at position 193 of SEQ ID NO: 21 is Thr or Cys;

(ii) X at position 257 of SEQ ID NO: 21 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 259 of SEQ ID NO: 21 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 260 of SEQ ID NO: 21 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(b) the second polypeptide chain comprises an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 22, wherein X at position 191 of SEQ ID NO: 22 is Ser or Cys;

(c) the first polypeptide chain comprises an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 53, wherein:

- (i) X at position 193 of SEQ ID NO: 53 is Thr or Cys;
- (ii) X at position 257 of SEQ ID NO: 53 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;
- (iii) X at position 259 of SEQ ID NO: 53 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and
- (iv) X at position 260 of SEQ ID NO: 53 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(d) the second polypeptide chain comprises an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 54, wherein X at position 191 of SEQ ID NO: 54 is Ser or Cys;

(e) both (a) and (b), both (a) and (d), both (b) and (c), or both (c) and (d);

(f) the first polypeptide chain comprises an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 34, wherein:

- (i) X at position 165 of SEQ ID NO: 34 is Thr or Cys;
- (ii) X at position 229 of SEQ ID NO: 34 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;
- (iii) X at position 231 of SEQ ID NO: 34 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and
- (iv) X at position 232 of SEQ ID NO: 34 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(g) the second polypeptide chain comprises an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 35, wherein X at position 172 of SEQ ID NO: 35 is Ser or Cys;

(h) the first polypeptide chain comprises an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 61, wherein:

- (i) X at position 172 of SEQ ID NO: 61 is Thr or Cys;
- (ii) X at position 236 of SEQ ID NO: 61 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 238 of SEQ ID NO: 61 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 239 of SEQ ID NO: 61 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(i) the second polypeptide chain comprises an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 62, wherein X at position 170 of SEQ ID NO: 62 is Ser or Cys;

(j) both (f) and (g), or both (h) and (i);

(k) the first polypeptide chain comprises an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 36;

(l) the second polypeptide chain comprises an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 37;

(m) the first polypeptide chain comprises an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 63;

(n) the second polypeptide chain comprises an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 64;

(o) the first polypeptide chain comprises an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 42;

(p) the second polypeptide chain comprises an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 43;

(q) the first polypeptide chain comprises an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 65;

(r) the second polypeptide chain comprises an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 66;

(s) both (k) and (l), both (m) and (n), both (o) and (p), or both (q) and (r);

(t) the first polypeptide chain comprises an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 23;

(u) the second polypeptide chain comprises an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 24;

(v) the first polypeptide chain comprises an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 55;

(w) the second polypeptide chain comprises an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 56;

(x) the first polypeptide chain comprises an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 40;

(y) the second polypeptide chain comprises an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 41;

(z) the first polypeptide chain comprises an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 57;

(aa) the second polypeptide chain comprises an amino acid sequence at least 99% identical to the amino acid sequence of SEQ ID NO: 58; or

(ab) both (t) and (u), both (t) and (w), both (u) and (v), both (v) and (w), both (x) and (y), both (x) and (aa), both (y) and (z), or both (z) and (aa).

27. The isolated or purified protein according to any one of claims 21-26, wherein:

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

(i) X at position 193 of SEQ ID NO: 21 is Thr or Cys;

(ii) X at position 257 of SEQ ID NO: 21 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(iii) X at position 259 of SEQ ID NO: 21 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and

(iv) X at position 260 of SEQ ID NO: 21 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

(b) the second polypeptide chain comprises the amino acid sequence of SEQ ID NO: 22, wherein X at position 191 of SEQ ID NO: 22 is Ser or Cys;

(c) the first polypeptide chain comprises the amino acid sequence of SEQ ID NO: 53, wherein:

(i) X at position 193 of SEQ ID NO: 53 is Thr or Cys;

(ii) X at position 257 of SEQ ID NO: 53 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;

- (iii) X at position 259 of SEQ ID NO: 53 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and
- (iv) X at position 260 of SEQ ID NO: 53 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;
- (d) the second polypeptide chain comprises the amino acid sequence of SEQ ID NO: 45, wherein X at position 191 of SEQ ID NO: 54 is Ser or Cys;
- (e) both (a) and (b), both (a) and (d), both (b) and (c), or both (c) and (d);
- (f) the first polypeptide chain comprises the amino acid sequence of SEQ ID NO: 34, wherein:
 - (i) X at position 165 of SEQ ID NO: 34 is Thr or Cys;
 - (ii) X at position 229 of SEQ ID NO: 34 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;
 - (iii) X at position 231 of SEQ ID NO: 34 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and
 - (iv) X at position 232 of SEQ ID NO: 34 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;
- (g) the second polypeptide chain comprises the amino acid sequence of SEQ ID NO: 35, wherein X at position 172 of SEQ ID NO: 35 is Ser or Cys;
- (h) the first polypeptide chain comprises the amino acid sequence of SEQ ID NO: 61, wherein:
 - (i) X at position 172 of SEQ ID NO: 61 is Thr or Cys;
 - (ii) X at position 236 of SEQ ID NO: 61 is Ser, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;
 - (iii) X at position 238 of SEQ ID NO: 61 is Met, Ala, Val, Leu, Ile, Pro, Phe, or Trp; and
 - (iv) X at position 239 of SEQ ID NO: 61 is Gly, Ala, Val, Leu, Ile, Pro, Phe, Met, or Trp;
- (i) the second polypeptide chain comprises the amino acid sequence of SEQ ID NO: 62, wherein X at position 170 of SEQ ID NO: 62 is Ser or Cys;
- (j) both (f) and (g), or both (h) and (i);
- (k) the first polypeptide chain comprises the amino acid sequence of SEQ ID NO: 36;

- (l) the second polypeptide chain comprises the amino acid sequence of SEQ ID NO: 37;
- (m) the first polypeptide chain comprises the amino acid sequence of SEQ ID NO: 63;
- (n) the second polypeptide chain comprises the amino acid sequence of SEQ ID NO: 64;
- (o) the first polypeptide chain comprises the amino acid sequence of SEQ ID NO: 42;
- (p) the second polypeptide chain comprises the amino acid sequence of SEQ ID NO: 43;
- (q) the first polypeptide chain comprises the amino acid sequence of SEQ ID NO: 65;
- (r) the second polypeptide chain comprises the amino acid sequence of SEQ ID NO: 66;
- (s) both (k) and (l), both (m) and (n), both (o) and (p), or both (q) and (r);
- (t) the first polypeptide chain comprises the amino acid sequence of SEQ ID NO: 23;
- (u) the second polypeptide chain comprises the amino acid sequence of SEQ ID NO: 24;
- (v) the first polypeptide chain comprises the amino acid sequence of SEQ ID NO: 55;
- (w) the second polypeptide chain comprises the amino acid sequence of SEQ ID NO: 56;
- (x) the first polypeptide chain comprises the amino acid sequence of SEQ ID NO: 40;
- (y) the second polypeptide chain comprises the amino acid sequence of SEQ ID NO: 41;
- (z) the first polypeptide chain comprises the amino acid sequence of SEQ ID NO: 57;
- (aa) the second polypeptide chain comprises the amino acid sequence of SEQ ID NO: 58; or
- (ab) both (t) and (u), both (t) and (w), both (u) and (v), both (v) and (w), both (x) and (y), both (x) and (aa), both (y) and (z), or both (z) and (aa).

28. An isolated or purified nucleic acid comprising a nucleotide sequence encoding the TCR according to any one of claims 1-13, the polypeptide according to any one of claims 14-20, or the protein according to any one of claims 21-27.

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; 51 and 8; 7 and 52; 51 and 52; 8 and 7; 8 and 51; 52 and 7; 52 and 51; 21 and 22; 53 and 22; 21 and 54; 53 and 54; 22 and 21; 22 and 53; 54 and 21; 54 and 53; 23 and 24; 55 and 24; 23 and 56; 55 and 56; 24 and 23; 24 and 55; 56 and 23; 56 and 55; 32 and 33; 33 and 32; 59 and 60; 60 and 59; 34 and 35; 35 and 34; 61 and 62; 62 and 61; 36 and 37; 37 and 36; 63 and 64; 64 and 63; 40 and 41; 57 and 41; 40 and 58; 57 and 58; 41 and 40; 41 and 57; 58 and 40; 58 and 57; 42 and 43; 43 and 42; 65 and 66; or 66 and 65.

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 RAKRSGSGATNFSLLKQAGDVEENPGP (SEQ ID NO: 25).

32. A recombinant expression vector comprising the nucleic acid according to any one of claims 28-31.

33. The recombinant expression vector according to claim 32, which is a transposon or a lentiviral vector.

34. An isolated or purified TCR, polypeptide, or protein encoded by the nucleic acid according to any one of claims 28-31 or the vector according to claim 32 or 33.

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 VVVGADGVGK (SEQ ID NO: 29), 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.

37. An isolated or purified host cell comprising the nucleic acid according to any one of claims 28-31 or the recombinant expression vector according to claim 32 or 33.

38. The host cell according to claim 37, wherein the cell is a human lymphocyte.

39. The host cell according to claim 37 or 38, wherein the cell is selected from a T cell, a natural killer T (NKT) cell, an invariant natural killer T (iNKT) cell, and a natural killer (NK) cell.

40. An isolated or purified population of cells comprising the host cell according to any one of claims 37-39.

41. A method of producing the TCR according to any one of claims 1-13, 34, or 35, the polypeptide according to any one of claims 14-20, 34, or 35, or the protein according to any one of claims 21-27, 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.

42. A pharmaceutical composition comprising (a) the TCR according to any one of claims 1-13, 34, or 35, the polypeptide according to any one of claims 14-20, 34, or 35, the protein according to any one of claims 21-27, 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, or the population of cells according to claim 40 and (b) a pharmaceutically acceptable carrier.

43. A method of detecting the presence of cancer in a mammal, the method comprising:

(a) contacting a sample comprising cells of the cancer with the TCR according to any one of claims 1-13, 34, or 35, the polypeptide according to any one of claims 14-20, 34, or 35, the protein according to any one of claims 21-27, 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 1-13, 34, or 35, the polypeptide according to any one of claims 14-20, 34, or 35, the protein according to any one of claims 21-27, 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 cancer in a mammal.

45. The TCR according to any one of claims 1-13, 34, or 35, the polypeptide according to any one of claims 14-20, 34, or 35, the protein according to any one of claims 21-27, 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 for use in treating or preventing cancer in a mammal.

46. The method according to claim 43 or the TCR, polypeptide, protein, nucleic acid, recombinant expression vector, host cell, population of cells, or pharmaceutical composition for use according to claim 44 or 45, wherein the cancer expresses a mutated human RAS amino acid sequence with a substitution of glycine at position 12 with aspartic acid,

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 or the TCR, polypeptide, protein, nucleic acid, recombinant expression vector, host cell, population of cells, or pharmaceutical composition for use according to claim 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 or the TCR, polypeptide, protein, nucleic acid, recombinant expression vector, host cell, population of cells, or pharmaceutical composition for use according to claim 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 or the TCR, polypeptide, protein, nucleic acid, recombinant expression vector, host cell, population of cells, or pharmaceutical composition for use according to claim 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 or 46-49 or the TCR, polypeptide, protein, nucleic acid, recombinant expression vector, host cell, population of cells, or pharmaceutical composition for use according to any one of claims 44-49, wherein the cancer is pancreatic, colorectal, lung, endometrial, ovarian, or prostate cancer.