

Claims

1. A T cell receptor (TCR), wherein the TCR has an activity of binding to KASEKIFYV-HLA A0201 complex,

5 wherein the TCR α chain variable domain comprises 3 CDRs, CDR1 α , CDR2 α and CDR3 α , the TCR β chain variable domain comprises 3 CDR regions, CDR1 β , CDR2 β and CDR3 β , and the TCR α chain and β chain variable domain have CDRs selected from the group consisting of:

TCR No.	A-CDR1	A-CDR2	A-CDR3	B-CDR1	B-CDR2	B-CDR3
1	DSSSTY	IFSNMDM	AEPNQAGTALI	MNHEY	SVGEGT	ASSSLEDPFVKR
2	DSSSTY	IFSNMDM	AEPNQAGTALI	MNHEY	SVGEGT	ASADVQDPYEQY
3	DSSSTY	IFSNMDM	AEPNQAGTALI	MNHEY	SVGEGT	ASADIQDPYEQY
4	DSSSTY	IFSNMDM	AEPNQAGTALI	MNHEY	SVGEGT	ASSSLEDPYVMT
5	DSSSTY	IFSNMDM	AEPNQAGTALI	MNHEY	SVGEGT	ASSSLEDPYIKY
6	DSSSTY	IFSNMDM	AEPNQAGTALI	MNHEY	SVGEGT	ASSSLEDPYIVT
7	DSSSTY	IFSNMDM	AEPNQAGTALI	MNHEY	SVGEGT	ASSSLEDPYVKI
8	DSSSTY	IFSNMDM	AEPNQAGTALI	MNHEY	SVGEGT	ASSSLEDPYIKT
9	DSSSTY	IFSNMDM	AEPNQAGTALI	MNHEY	SVGEGT	ASSSLEDPYILN
10	DSSSTY	IFSNMDM	AEPNQAGTALI	MNHEY	SVGEGT	ASSSLEDPYILT
11	DSSSTY	IFSNMDM	AEPNNSHSALI	MNHEY	SVGEGT	ASSSLEDPYEQY
12	DSSSTY	IFSNMDM	AEPNAAHSALI	MNHEY	SVGEGT	ASSSLEDPYEQY
13	DSSSTY	IFSNMDM	AEPNASHSALI	MNHEY	SVGEGT	ASSSLEDPYEQY
14	DSSSTY	IFSNMDM	AEPNSSHSALI	MNHEY	SVGEGT	ASSSLEDPYEQY
15	DSSSTY	IFSNMDM	AEPNSAHSALI	MNHEY	SVGEGT	ASSSLEDPYEQY
16	DSSSTY	IFSNMDM	AEPNNAHSALI	MNHEY	SVGEGT	ASSSLEDPYEQY
17	DSSSTY	IFSNMDM	AEPNKSHSALI	MNHEY	SVGEGT	ASSSLEDPYEQY
18	DSSSTY	IFSNMDM	AEPNQAHSALI	MNHEY	SVGEGT	ASSSLEDPYEQY
19	DSSSTY	IFSNMDM	AEPNQSHSALI	MNHEY	SVGEGT	ASSSLEDPYEQY
20	DSSSTY	IFSNMDM	AEPNRSHSALI	MNHEY	SVGEGT	ASSSLEDPYEQY
21	DSSSTY	IFSNMDM	AEPNKAHSALI	MNHEY	SVGEGT	ASSSLEDPYEQY
22	DSSSTY	IFSNMDM	AEPNTSHSALI	MNHEY	SVGEGT	ASSSLEDPYEQY
23	DSSSTY	IFSNMDM	AEPNDVTTALI	MNHEY	SVGEGT	ASSSLEDPYEQY
24	DSSSTY	IFSNMDM	AEPNESQSALI	MNHEY	SVGEGT	ASSSLEDPYEQY
25	DSSSTY	IFSNMDM	AEPNQAGTALI	MNHEY	SVGEGT	ASSDVTDPYEQY
26	DSSSTY	IFSNMDM	AEPNQAGTALI	MNHEY	SVGEGT	ASSSLEDPYIMA
27	DSSSTY	IFSNMDM	AEPNQAGTALI	MNHEY	SVGEGT	ASSSLEDPYVLE
28	DSSSTY	IFSNMDM	AEPNQAGTALI	MNHEY	SVGEGT	ASSSLEDPYPML
29	DSSSTY	IFSNMDM	AEPNQAGTALI	MNHEY	SVGEGT	ASSSLEDPYVVS

30	DSSSTY	IFSNMDM	AEPNQAGTALI	MNHEY	SVGEGT	ASSSLEDPYVMV
31	DSSSTY	IFSNMDM	AEPNQAGTALI	MNHEY	SVGEGT	ASSSVEDPYEQY
32	DPWATY	IFSYQST	AEPNNSHSALI	MNHEY	SLEVGT	ASADVQDPYEQY
33	DPWATY	IFSYMTE	AEPNASHSALI	MNHEY	HDWLGT	ASSSLEDPYVMV
34	DPWATY	IFSYQSE	AEPNKSHSALI	MNHEY	HDWLGT	ASSSLEDPYIKY
35	DPWATY	IFSYMTE	AEPNNSHSALI	MNHEY	HDWLGT	ASSSLEDPYVMQ
36	DPWATY	IFSYQST	AEPNKSHSALI	MNHEY	SDWLGT	ASADIQDPYEQY
37	DPWATY	IFSYQST	AEPNNSHSALI	MNHEY	SLEVGT	ASSSLEDPYIKT
38	DPWATY	IFSYMTE	AEPNASHSALI	MNHEY	SLEVGT	ASSSLEDPYVMQ
39	DPWATY	IFSYMTE	AEPNSSHSALI	MNHEY	SDWLGT	ASSSLEDPYVME
40	DRMSTY	IFSYQST	AEPNSSHSALI	MNHEY	SDWLGT	ASADVQDPYEQY
41	DTMSTY	IFSYMTE	AEPNKSHSALI	MNHEY	SDWLGT	ASADVQDPYEQY
42	DKMSTY	IFSYQST	AEPNNSHSALI	MNHEY	SDWLGT	ASADVQDPYEQY
43	DKMSTY	IFSYMTE	AEPNNSHSALI	MNHEY	SDWLGT	ASADVQDPYEQY
44	DPWATY	IFSYMTE	AEPNNSHSALI	MNHEY	SLEVGT	ASADIQDPYEQY
45	DPWATY	IFSYMTE	AEPNASHSALI	MNHEY	SLEVGT	ASADVQDPYEQY
46	DPWATY	IFSYQSE	AEPNKSHSALI	MNHEY	SLEVGT	ASADVQDPYEQY
47	DPWATY	IFSYMTE	AEPNNSHSALI	MNHEY	SLEVGT	ASADVQDPYEQY
48	DPWATY	IFSYQST	AEPNKSHSALI	MNHEY	SLEVGT	ASADVQDPYEQY
49	DPWATY	IFSYMTE	AEPNSSHSALI	MNHEY	SLEVGT	ASADVQDPYEQY
50	DPWATY	IFSYQST	AEPNNSHSALI	MNHEY	SLEVGT	ASADIQDPYEQY
51	DPWATY	IFSYMTE	AEPNASHSALI	MNHEY	SLEVGT	ASADIQDPYEQY
52	DPWATY	IFSYQSE	AEPNKSHSALI	MNHEY	SLEVGT	ASADIQDPYEQY
53	DPWATY	IFSYQST	AEPNKSHSALI	MNHEY	SLEVGT	ASADIQDPYEQY
54	DPWATY	IFSYMTE	AEPNSSHSALI	MNHEY	SLEVGT	ASADIQDPYEQY.

2. The TCR of claim 1, wherein the TCR comprises (i) all or part of the TCR α chain except for its transmembrane domain, and (ii) all or part of the TCR β chain except for its transmembrane domain, wherein both of (i) and (ii) comprise the variable domain and at least a portion of the constant domain of the TCR chain.

5 3. The TCR of claim 2, wherein an artificial interchain disulfide bond is contained between α chain constant region and β chain constant region of the TCR; and preferably, cysteine residues forming an artificial interchain disulfide bond between the TCR α chain constant region and β chain constant region are substituted for one or more groups of amino acids selected from the following:

10 Thr48 of TRAC*01 exon 1 and Ser57 of TRBC1*01 or TRBC2*01 exon 1;
 Thr45 of TRAC*01 exon 1 and Ser77 of TRBC1*01 or TRBC2*01 exon 1;
 Tyr10 of TRAC*01 exon 1 and Ser17 of TRBC1*01 or TRBC2*01 exon 1;

Thr45 of TRAC*01 exon 1 and Asp59 of TRBC1*01 or TRBC2*01 exon 1;
 Ser15 of TRAC*01 exon 1 and Glu15 of TRBC1*01 or TRBC2*01 exon 1;
 Arg53 of TRAC*01 exon 1 and Ser54 of TRBC1*01 or TRBC2*01 exon 1;
 Pro89 of TRAC*01 exon 1 and Ala19 of TRBC1*01 or TRBC2*01 exon 1; and
 Tyr10 of TRAC*01 exon 1 and Glu20 of TRBC1*01 or TRBC2*01 exon 1.

5

4. The TCR of claim 1, wherein the amino acid sequence of the α chain variable domain of the TCR is selected from SEQ ID NO: 64-87; and / or the amino acid sequence of the β chain variable domain of the TCR is selected from SEQ ID NO: 88-114.

5. The TCR of claim 1, wherein the TCR is selected from:

TCR No.	sequence of α chain variable domain SEQ ID NO:	sequence of β chain variable domain SEQ ID NO:
1	1	88
2	1	89
3	1	90
4	1	91
5	1	92
6	1	93
7	1	94
8	1	95
9	1	96
10	1	97
11	64	2
12	65	2
13	66	2
14	67	2
15	68	2
16	69	2
17	70	2
18	71	2
19	72	2
20	73	2
21	74	2
22	75	2
23	76	2
24	77	2
25	1	98

26	1	99
27	1	100
28	1	101
29	1	102
30	1	103
31	1	104
32	78	105
33	79	106
34	80	107
35	81	108
36	82	109
37	78	110
38	79	111
39	83	112
40	84	113
41	85	113
42	86	113
43	87	113
44	81	114
45	79	105
46	80	105
47	81	105
48	82	105
49	83	105
50	78	114
51	79	114
52	80	114
53	82	114
54	83	114.

6. The TCR of claim 1, wherein the TCR is a single chain TCR.

7. The TCR of claim 1, wherein the TCR is a single-chain TCR consisting of an α chain variable domain and a β chain variable domain, and the α chain variable domain and the β chain variable domain are connected by a flexible short peptide sequence (linker).

5 8. The TCR of any one of claims 1-7, wherein a conjugate binds to the α chain and/or β chain of the TCR at C- or N-terminal; preferably, the conjugate is a detectable label; and more

preferably, the conjugate is an anti-CD3 antibody.

9. A multivalent TCR complex comprising at least two TCR molecules, and at least one TCR molecule is the TCR of any one of claims 1-8.

5 10. A nucleic acid molecule, comprising a nucleic acid sequence encoding the TCR of any one of claims 1-8, or a complement sequence thereof.

11. A vector, comprising the nucleic acid molecule of claim 10.

12. A host cell, comprising the vector of claim 11 or having the exogenous nucleic acid molecule of claim 10.

10 13. An isolated cell, expressing the TCR of any one of claims 1-8, wherein the isolated cell is a T cell.

14. A pharmaceutical composition, comprising a pharmaceutically acceptable carrier, and the TCR of any one of claims 1-8, or the TCR complex of claim 9, or the cell of claim 13.

15 15. Use of the TCR of any one of claims 1-8, or the TCR complex of claim 9, or the cell of claim 13 for preparing a medicament for treating a tumor.

16. The TCR of any one of claims 1-8, or the TCR complex of claim 9, or the cell of claim 13 for use as a medicament for treating a tumor.

17. A method for preparing the T cell receptor of any one of claims 1-8, comprising the steps of:

20 (i) culturing the host cell of claim 12 to express the T cell receptor of any one of claims 1-8;

(ii) isolating or purifying the T cell receptor.