

WHAT IS CLAIMED IS:

1. A T cell receptor (TCR) or antigen-binding fragment thereof, comprising an alpha chain comprising a variable alpha (Va) region and a beta chain comprising a variable beta (Vb) region, wherein
 - (a) the Va region comprises a complementarity determining region 1 (CDR1), a complementarity determining region 2 (CDR2), and a complementarity determining region 3 (CDR3), wherein the CDR3 of the Va region comprises an amino acid sequence X₁GX₂SGYSTL, wherein
 - the X₁ is a E, T, Q, V, or N,
 - the X₂ is a D, G, N, or E ; and
 - (b) the Vb region comprises a CDR1, a CDR2, and a CDR3, wherein the CDR3 of the Vb region comprises an amino acid sequence X₃X₄QGGX₅X₆X₇X₈, wherein
 - the X₃ is a S, T, N, or R,
 - the X₄ is a T, R, Y, G, V, Q, F, S, or P,
 - the X₅ is a N, G, H, T, S, A, I, or W,
 - the X₆ is a Y, N, D, E, R, or I,
 - the X₇ is a G, Q, N, Y,
 - the X₈ is a Y, F, or G.
2. The T cell receptor (TCR) or antigen-binding fragment thereof of claim 1, wherein the Va region is encoded by a sequence from rearrangement of a human TRAV gene segment and a human TRAJ gene segment, and the Vb region is encoded by a sequence from rearrangement of a human TRBV gene segment, optionally a human TRBD gene segment, and a human TRBJ gene segment, wherein
 - the TRAV gene segment is TRAV17;
 - the TRAJ gene segment is TRAJ11;
 - the TRBV gene segment is TRBV6-5;
 - the TRBD gene segment is TRBD1 or TRBD2; and
 - the TRBJ gene segment is TRBJ2-1 or TRBJ1-2.

3. The T cell receptor (TCR) or antigen-binding fragment thereof of claim 1 or claim 2, wherein the Va CDR1 region comprises an amino acid sequence that is at least 80% identical to TSINN (SEQ ID NO: 1), the Va CDR2 region comprises an amino acid sequence that is at least 80% identical to IRSNERE (SEQ ID NO: 2), the Vb CDR1 region comprises an amino acid sequence that is at least 80% identical to MNHEY (SEQ ID NO: 4), and the Vb CDR2 region comprises an amino acid sequence that is at least 80% identical to SVGAGI (SEQ ID NO: 5).
4. The T cell receptor (TCR) or antigen-binding fragment thereof of any one of claims 1-3, wherein the Va CDR1 region comprises an amino acid sequence that is at least 80% identical to a selected Va CDR1 amino acid sequence, the Va CDR2 region comprises an amino acid sequence that is at least 80% identical to a selected Va CDR2 amino acid sequence, the Va CDR3 region comprises an amino acid sequence that is at least 80% identical to a selected Va CDR3 amino acid sequence; and wherein the Vb CDR1 region comprises an amino acid sequence that is at least 80% identical to a selected Vb CDR1 amino acid sequence, the Vb CDR2 region comprises an amino acid sequence that is at least 80% identical to a selected Vb CDR2 amino acid sequence, the Vb CDR3 region comprises an amino acid sequence that is at least 80% identical to a selected Vb CDR3 amino acid sequence;
- wherein the selected Va CDRs 1, 2, and 3 and Vb CDRs 1, 2, and 3 amino acid sequences are one of the following:
- (1) the selected Va CDRs 1, 2, 3 amino acid sequences are set forth in SEQ ID NOs: 1-3, respectively, and the selected Vb CDRs 1, 2, 3 amino acid sequences are set forth in SEQ ID NOs: 4-6, respectively;
- (2) the selected Va CDRs 1, 2, 3 amino acid sequences are set forth in SEQ ID NOs: 7-9, respectively, and the selected Vb CDRs 1, 2, 3 amino acid sequences are set forth in SEQ ID NOs: 10-12, respectively;
- (3) the selected Va CDRs 1, 2, 3 amino acid sequences are set forth in SEQ ID NOs: 13-15, respectively, and the selected Vb CDRs 1, 2, 3 amino acid sequences are set forth in SEQ ID NOs: 16-18, respectively;

- (4) the selected Va CDRs 1, 2, 3 amino acid sequences are set forth in SEQ ID NOs: 19-21, respectively, and the selected Vb CDRs 1, 2, 3 amino acid sequences are set forth in SEQ ID NOs: 22-24, respectively;
- 5 (5) the selected Va CDRs 1, 2, 3 amino acid sequences are set forth in SEQ ID NOs: 25-27, respectively, and the selected Vb CDRs 1, 2, 3 amino acid sequences are set forth in SEQ ID NOs: 28-30, respectively;
- (6) the selected Va CDRs 1, 2, 3 amino acid sequences are set forth in SEQ ID NOs: 31-33, respectively, and the selected Vb CDRs 1, 2, 3 amino acid sequences are set forth in SEQ ID NOs: 34-36, respectively;
- 10 (7) the selected Va CDRs 1, 2, 3 amino acid sequences are set forth in SEQ ID NOs: 37-39, respectively, and the selected Vb CDRs 1, 2, 3 amino acid sequences are set forth in SEQ ID NOs: 40-42, respectively;
- (8) the selected Va CDRs 1, 2, 3 amino acid sequences are set forth in SEQ ID NOs: 43-45, respectively, and the selected Vb CDRs 1, 2, 3 amino acid sequences are set forth in
15 SEQ ID NOs: 46-48, respectively;
- (9) the selected Va CDRs 1, 2, 3 amino acid sequences are set forth in SEQ ID NOs: 49-51, respectively, and the selected Vb CDRs 1, 2, 3 amino acid sequences are set forth in SEQ ID NOs: 52-54, respectively;
- (10) the selected Va CDRs 1, 2, 3 amino acid sequences are set forth in SEQ ID NOs:
20 61-63, respectively, and the selected Vb CDRs 1, 2, 3 amino acid sequences are set forth in SEQ ID NOs: 64-66, respectively;
- (11) the selected Va CDRs 1, 2, 3 amino acid sequences are set forth in SEQ ID NOs: 67-69, respectively, and the selected Vb CDRs 1, 2, 3 amino acid sequences are set forth in SEQ ID NOs: 70-72, respectively;
- 25 (12) the selected Va CDRs 1, 2, 3 amino acid sequences are set forth in SEQ ID NOs: 73-75, respectively, and the selected Vb CDRs 1, 2, 3 amino acid sequences are set forth in SEQ ID NOs: 76-78, respectively;
- (13) the selected Va CDRs 1, 2, 3 amino acid sequences are set forth in SEQ ID NOs: 79-81, respectively, and the selected Vb CDRs 1, 2, 3 amino acid sequences are set forth in
30 SEQ ID NOs: 82-84, respectively; or

(14) the selected Va CDRs 1, 2, 3 amino acid sequences are set forth in SEQ ID NOs: 85-87, respectively, and the selected Vb CDRs 1, 2, 3 amino acid sequences are set forth in SEQ ID NOs: 88-90, respectively.

- 5 5. A T cell receptor (TCR) or antigen-binding fragment thereof, comprising
 - an alpha chain comprising a variable alpha (Va) region, wherein the Va region comprises a complementarity determining region 1 (CDR-1), a complementarity determining region 2 (CDR-2), and a complementarity determining region 3 (CDR-3), wherein the Va CDR1 region comprises an amino acid sequence that is at least 80% identical to SEQ ID NO: 55, the Va CDR2 region comprises an amino acid sequence that is at least 80% identical to SEQ ID NO: 56, the Va CDR3 region comprises an amino acid sequence that is at least 80% identical to SEQ ID NO: 57; and
 - a beta chain comprising a variable beta (Vb) region, wherein the Vb region comprises a complementarity determining region 1 (CDR-1), a complementarity determining region 2 (CDR-2), and a complementarity determining region 3 (CDR-3), wherein the Vb CDR1 region comprises an amino acid sequence that is at least 80% identical to SEQ ID NO: 58, the Vb CDR2 region comprises an amino acid sequence that is at least 80% identical to SEQ ID NO: 59, the Vb CDR3 region comprises an amino acid sequence that is at least 80% identical to SEQ ID NO: 60.
- 20 6. The TCR or antigen-binding fragment thereof of any one of claims 1-5, wherein the TCR or antigen-binding fragment thereof binds to or recognizes a peptide epitope of LMP2 (FLYALALLL) (SEQ ID NO: 139) that is presented by a major histocompatibility complex (MHC) molecule.
- 25 7. The TCR or antigen-binding fragment thereof of claim 6, wherein the MHC molecule is an HLA-A2 molecule.
- 30 8. The T cell receptor (TCR) or antigen-binding fragment thereof of claim 1, wherein the Va region is encoded by a sequence from rearrangement of a human TRAV gene segment and a human TRAJ gene segment, and the Vb region is encoded by a sequence from rearrangement of

a human TRBV gene segment, optionally a human TRBD gene segment, and a human TRBJ gene segment, wherein

the TRAV gene segment is TRAV21;

the TRAJ gene segment is TRAJ33;

5 the TRBV gene segment is TRBV10-2;

the TRBD gene segment is TRBD1 or TRBD2; and

the TRBJ gene segment is TRBJ2-7.

9. The T cell receptor (TCR) or antigen-binding fragment thereof of claim 1 or 8,

10 wherein the Va CDR1 region comprises an amino acid sequence that is at least 80% identical to SEQ ID NO: 143, the Va CDR2 region comprises an amino acid sequence that is at least 80% identical to SEQ ID NO: 144, the Va CDR3 region comprises an amino acid sequence that is at least 80% identical to SEQ ID NO: 145; and

15 wherein the Vb CDR1 region comprises an amino acid sequence that is at least 80% identical to SEQ ID NO: 146, the Vb CDR2 region comprises an amino acid sequence that is at least 80% identical to SEQ ID NO: 147, the Vb CDR3 region comprises an amino acid sequence that is at least 80% identical to SEQ ID NO: 148.

10. A T cell receptor (TCR) or antigen-binding fragment thereof, comprising

20 an alpha chain comprising a variable alpha (Va) region, wherein the Va region comprises a complementarity determining region 1 (CDR-1), a complementarity determining region 2 (CDR-2), and a complementarity determining region 3 (CDR-3), wherein the Va CDR1 region comprises an amino acid sequence that is at least 80% identical to SEQ ID NO: 143, the Va CDR2 region comprises an amino acid sequence that is at least 80% identical to
25 SEQ ID NO: 144, the Va CDR3 region comprises an amino acid sequence that is at least 80% identical to SEQ ID NO: 145; and

a beta chain comprising a variable beta (Vb) region, wherein the Vb region comprises a complementarity determining region 1 (CDR-1), a complementarity determining region 2 (CDR-2), and a complementarity determining region 3 (CDR-3), wherein the Vb CDR1 region
30 comprises an amino acid sequence that is at least 80% identical to SEQ ID NO: 146, the Vb CDR2 region comprises an amino acid sequence that is at least 80% identical to SEQ ID NO:

147, the Vb CDR3 region comprises an amino acid sequence that is at least 80% identical to SEQ ID NO: 148.

11. The TCR or antigen-binding fragment thereof of any one of claims 1 and 8-10, wherein the
5 TCR or antigen-binding fragment thereof binds to or recognizes a peptide epitope of LMP2
CLGGLTMMV (SEQ ID NO: 167) and/or SLGGLTMMV (SEQ ID NO: 168) that is presented
by a major histocompatibility complex (MHC) molecule.

12. The TCR or antigen-binding fragment thereof of claim 11, wherein the MHC molecule is an
10 HLA-A2 molecule.

13. A T cell receptor (TCR) or antigen-binding fragment thereof, comprising:
an alpha chain comprising a variable alpha (Va) region, wherein the Va region
comprises a complementarity determining region 1 (CDR-1), a complementarity determining
15 region 2 (CDR-2), and a complementarity determining region 3 (CDR-3), wherein the Va
CDR1 region comprises an amino acid sequence that is at least 80% identical to a selected Va
CDR1 amino acid sequence, the Va CDR2 region comprises an amino acid sequence that is at
least 80% identical to a selected Va CDR2 amino acid sequence, the Va CDR3 region
comprises an amino acid sequence that is at least 80% identical to a selected Va CDR3 amino
20 acid sequence; and
a beta chain comprising a variable beta (Vb) region, wherein the Vb region comprises a
complementarity determining region 1 (CDR-1), a complementarity determining region 2
(CDR-2), and a complementarity determining region 3 (CDR-3), wherein the Vb CDR1 region
comprises an amino acid sequence that is at least 80% identical to a selected Vb CDR1 amino
25 acid sequence, the Vb CDR2 region comprises an amino acid sequence that is at least 80%
identical to a selected Vb CDR2 amino acid sequence, the Vb CDR3 region comprises an
amino acid sequence that is at least 80% identical to a selected Vb CDR3 amino acid sequence;
wherein the selected Va CDRs 1, 2, and 3 and Vb CDRs 1, 2, and 3 amino acid
sequences are one of the following:

(1) the selected Va CDRs 1, 2, 3 amino acid sequences are set forth in SEQ ID NOs: 91, 92, and 93, respectively, and the selected Vb CDRs 1, 2, 3 amino acid sequences are set forth in SEQ ID NOs: 94, 95, and 96, respectively;

(2) the selected Va CDRs 1, 2, 3 amino acid sequences are set forth in SEQ ID NOs: 97, 98, and 99, respectively, and the selected Vb CDRs 1, 2, 3 amino acid sequences are set forth in SEQ ID NOs: 100, 101, and 102, respectively;

(3) the selected Va CDRs 1, 2, 3 amino acid sequences are set forth in SEQ ID NOs: 103, 104, and 105, respectively, and the selected Vb CDRs 1, 2, 3 amino acid sequences are set forth in SEQ ID NOs: 106, 107, and 108, respectively;

(4) the selected Va CDRs 1, 2, 3 amino acid sequences are set forth in SEQ ID NOs: 149, 150, and 151, respectively, and the selected Vb CDRs 1, 2, 3 amino acid sequences are set forth in SEQ ID NOs: 152, 153, and 154, respectively; and

(5) the selected Va CDRs 1, 2, 3 amino acid sequences are set forth in SEQ ID NOs: 155, 156, and 157, respectively, and the selected Vb CDRs 1, 2, 3 amino acid sequences are set forth in SEQ ID NOs: 158, 159, and 160, respectively

14. The T cell receptor (TCR) or antigen-binding fragment thereof of claim 13, wherein the Va region is encoded by a sequence from rearrangement of a human TRAV gene segment and a human TRAJ gene segment, and the Vb region is encoded by a sequence from rearrangement of a human TRBV gene segment, optionally a human TRBD gene segment, and a human TRBJ gene segment, wherein

the TRAV gene segment is TRAV4, TRAV25, TRAV22, or TRAV6;

the TRAJ gene segment is TRAJ23, TRAJ47, TRAJ29, TRAJ43, or TRAJ11;

the TRBV gene segment is TRBV12-4, TRBV12-3, TRBV11-2, TRBV4-1, or TRBV11-2;

the TRBD gene segment is TRBD2; and

the TRBJ gene segment is TRBJ1-1, TRBJ2-1, TRBJ2-5, or TRBJ2-7.

15. The TCR or antigen-binding fragment thereof of claim 13 or 14, wherein the TCR or antigen-binding fragment thereof binds to or recognizes a peptide epitope of LMP2

(SSCSSCPLSK) (SEQ ID NO: 140) that is presented by a major histocompatibility complex (MHC) molecule.

16. The TCR or antigen-binding fragment thereof of claim 15, wherein the MHC molecule is an HLA-A11 molecule.

17. A T cell receptor (TCR) or antigen-binding fragment thereof, comprising:

an alpha chain comprising a variable alpha (Va) region, wherein the Va region comprises a complementarity determining region 1 (CDR-1), a complementarity determining region 2 (CDR-2), and a complementarity determining region 3 (CDR-3), wherein the Va CDR1 region comprises an amino acid sequence that is at least 80% identical to a selected Va CDR1 amino acid sequence, the Va CDR2 region comprises an amino acid sequence that is at least 80% identical to a selected Va CDR2 amino acid sequence, the Va CDR3 region comprises an amino acid sequence that is at least 80% identical to a selected Va CDR3 amino acid sequence; and

a beta chain comprising a variable beta (Vb) region, wherein the Vb region comprises a complementarity determining region 1 (CDR-1), a complementarity determining region 2 (CDR-2), and a complementarity determining region 3 (CDR-3), wherein the Vb CDR1 region comprises an amino acid sequence that is at least 80% identical to a selected Vb CDR1 amino acid sequence, the Vb CDR2 region comprises an amino acid sequence that is at least 80% identical to a selected Vb CDR2 amino acid sequence, the Vb CDR3 region comprises an amino acid sequence that is at least 80% identical to a selected Vb CDR3 amino acid sequence;

wherein the selected Va CDRs 1, 2, and 3 and Vb CDRs 1, 2, and 3 amino acid sequences are one of the following:

(1) the selected Va CDRs 1, 2, 3 amino acid sequences are set forth in SEQ ID NOs: 109, 110, and 111, respectively, and the selected Vb CDRs 1, 2, 3 amino acid sequences are set forth in SEQ ID NOs: 112, 113, and 114, respectively; or

(2) the selected Va CDRs 1, 2, 3 amino acid sequences are set forth in SEQ ID NOs: 115, 116, and 117, respectively, and the selected Vb CDRs 1, 2, 3 amino acid sequences are set forth in SEQ ID NOs: 118, 119, and 120, respectively.

18. The T cell receptor (TCR) or antigen-binding fragment thereof of claim 17, wherein the Va region is encoded by a sequence from rearrangement of a human TRAV gene segment and a human TRAJ gene segment, and the Vb region is encoded by a sequence from rearrangement of a human TRBV gene segment, optionally a human TRBD gene segment, and a human TRBJ gene segment, wherein

- the TRAV gene segment is TRAV12-1;
- the TRAJ gene segment is TRAJ21;
- the TRBV gene segment is TRBV20-1;
- 10 the TRBD gene segment is TRBD1; and
- the TRBJ gene segment is TRBJ2-5 or TRBJ2-3.

19. The TCR or antigen-binding fragment thereof of claim 17 or 18, wherein the TCR or antigen-binding fragment thereof binds to or recognizes a peptide epitope of LMP2 (IYVLVMLVL) (SEQ ID NO: 141) that is presented by a major histocompatibility complex (MHC) molecule.

20. A T cell receptor (TCR) or antigen-binding fragment thereof, comprising:
an alpha chain comprising a variable alpha (Va) region, wherein the Va region
20 comprises a complementarity determining region 1 (CDR-1), a complementarity determining region 2 (CDR-2), and a complementarity determining region 3 (CDR-3), wherein the Va CDR1 region comprises an amino acid sequence that is at least 80% identical to a selected Va CDR1 amino acid sequence, the Va CDR2 region comprises an amino acid sequence that is at least 80% identical to a selected Va CDR2 amino acid sequence, the Va CDR3 region
25 comprises an amino acid sequence that is at least 80% identical to a selected Va CDR3 amino acid sequence; and
a beta chain comprising a variable beta (Vb) region, wherein the Vb region comprises a complementarity determining region 1 (CDR-1), a complementarity determining region 2 (CDR-2), and a complementarity determining region 3 (CDR-3), wherein the Vb CDR1 region
30 comprises an amino acid sequence that is at least 80% identical to a selected Vb CDR1 amino acid sequence, the Vb CDR2 region comprises an amino acid sequence that is at least 80%

identical to a selected Vb CDR2 amino acid sequence, the Vb CDR3 region comprises an amino acid sequence that is at least 80% identical to a selected Vb CDR3 amino acid sequence;

wherein the selected Va CDRs 1, 2, and 3 and Vb CDRs 1, 2, and 3 amino acid sequences are one of the following:

5 (1) the selected Va CDRs 1, 2, 3 amino acid sequences are set forth in SEQ ID NOs: 121, 122, and 123, respectively, and the selected Vb CDRs 1, 2, 3 amino acid sequences are set forth in SEQ ID NOs: 124, 125, and 126, respectively;

(2) the selected Va CDRs 1, 2, 3 amino acid sequences are set forth in SEQ ID NOs: 127, 128, and 129, respectively, and the selected Vb CDRs 1, 2, 3 amino acid sequences are set
10 forth in SEQ ID NOs: 130, 131, and 132, respectively;

(3) the selected Va CDRs 1, 2, 3 amino acid sequences are set forth in SEQ ID NOs: 133, 134, and 135, respectively, and the selected Vb CDRs 1, 2, 3 amino acid sequences are set forth in SEQ ID NOs: 136, 137, and 138, respectively; or

(4) the selected Va CDRs 1, 2, 3 amino acid sequences are set forth in SEQ ID NOs:
15 161, 162, and 163, respectively, and the selected Vb CDRs 1, 2, 3 amino acid sequences are set forth in SEQ ID NOs: 164, 165, and 166, respectively.

21. The T cell receptor (TCR) or antigen-binding fragment thereof of claim 15, wherein the Va region is encoded by a sequence from rearrangement of a TCR alpha variable (TRAV) gene segment and a TCR alpha joining (TRAJ) gene segment, wherein the Vb region is encoded by a
20 sequence from rearrangement of a TCR beta variable (TRBV) gene segment, optionally a TCR beta diversity (TRBD) gene segment, and a TCR beta joining (TRBJ) gene segment, wherein

the TRAV gene segment is TRAV25, TRAV12-3, or TRAV21;
the TRAJ gene segment is TRAJ16, TRAJ3, or TRAJ35;
25 the TRBV gene segment is TRBV6-6, TRBV24-1, or TRBV30;
the TRBD gene segment is TRBD1 or TRBD2; and
the TRBJ gene segment is TRBJ1-1, TRBJ2-5, TRBJ2-3, or TRBJ2-7.

22. The TCR or antigen-binding fragment thereof of claim 20 or 21, wherein the TCR or
30 antigen-binding fragment thereof binds to or recognizes a peptide epitope of LMP2

(TYGPVFMCL) (SEQ ID NO: 142) that is presented by a major histocompatibility complex (MHC) molecule.

23. The TCR or antigen-binding fragment thereof of claim 19 or 22, wherein the MHC
5 molecule is an HLA-A24 molecule.

24. The TCR or antigen-binding fragment thereof of any one of claims 1-23, wherein the alpha
chain comprises a mouse alpha chain constant region, and the beta chain comprises a mouse
beta chain constant region.

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25. The TCR or antigen-binding fragment thereof of any one of claims 1-23, wherein the alpha
chain comprises a human alpha chain constant region, and the beta chain comprises a human
beta chain constant region.

15 26. The TCR or antigen-binding fragment thereof of any of claims 1-25, wherein, the TCR or
antigen-binding fragment thereof, when expressed on the surface of a T cell, stimulates
cytotoxic activity against a target cancer cell.

27. The TCR or antigen-binding fragment thereof of claim 26, wherein the target cancer cell
20 comprises a nucleic acid sequence encoding LMP2 or expresses LMP2.

28. A vector comprising a nucleic acid encoding TCR or antigen-binding fragment thereof of
any one of claims 1-27.

25 29. A vector comprising:

a) a first nucleic acid sequence encoding a TCR alpha chain comprising an alpha chain
variable region of a human anti-LMP2 TCR and an alpha chain constant region; and

b) a second nucleic acid sequence encoding a TCR beta chain comprising a beta chain
variable region of the human anti-LMP2 TCR and a beta chain constant region,

30 wherein the TCR alpha chain and the TCR beta chain form the TCR or antigen-binding
fragment thereof of any one of claims 1-27.

30. The vector of claim 29, wherein the first nucleic acid sequence and the second nucleic acid sequence is linked by a linker sequence.
- 5 31. The vector of claim 30, wherein the linker sequence is a P2A sequence.
32. The vector of any one of claims 28-31, wherein the vector is an expression vector, a viral vector, a retroviral vector, or a lentiviral vector.
- 10 33. The vector of claim 32, wherein the retroviral vector is pMP71.
34. An engineered cell comprising the vector of any one of claims 28-33.
35. An engineered cell, comprising the TCR or antigen-binding fragment thereof of any of
15 claims 1-27.
36. The engineered cell of claim 34 or 35, wherein the TCR or antigen binding fragment thereof is heterologous to the cell.
- 20 37. The engineered cell of any one of claims 34-36, wherein the engineered cell is a cell line.
38. The engineered cell of any one of claims 34-36, wherein the engineered cell is a primary cell obtained from a subject (e.g., a human subject).
- 25 39. The engineered cell of any of claims 34-38, wherein the engineered cell is a T cell.
40. The engineered cell of claim 39, wherein the T-cell is isolated from a human subject.
- 30 41. The engineered cell of claim 39, wherein the T cell is CD8+.

42. The engineered cell of claim 39, wherein the T cell is CD4+.
43. The engineered cell of any one of claims 34-42, wherein the engineered cell expresses a bifunctional trap protein.
- 5 44. The engineered cell of claim 43, wherein the bifunctional trap protein targets a checkpoint inhibitor (e.g., PD-1) and a member of the transforming growth factor beta family (e.g., TGF- β).
- 10 45. The engineered cell of any one of claims 34-42, wherein the engineered cell expresses an antibody or antigen-binding fragment thereof targeting a checkpoint inhibitor (e.g., PD-1).
46. The engineered cell of any one of claims 34-42 and 45, wherein the engineered cell expresses a protein that binds to a member of the transforming growth factor beta family (e.g.,
- 15 TGF- β).
47. A method for producing the engineered cell, comprising introducing the vector of any one of claims 28-33 into the cell *in vitro* or *ex vivo*.
- 20 48. The method of claim 47, wherein the introducing step is carried out by transduction.
49. A method of treating a disease or a disorder, comprising administering the engineered cell of any one of claims 34-46 to a subject having a disease or disorder associated with EBV.
- 25 50. The method of claim 49, wherein the disease or disorder associated with EBV is a cancer.
51. A method of treating a tumor in a subject, the method comprising administering to the subject in need thereof an engineered T cell, comprising a nucleic acid encoding the TCR or antigen-binding fragment thereof of claims 1-27 that specifically
- 30 binds to an antigen in the tumor.

52. A method of treating a tumor in a subject, the method comprising administering to the subject in need thereof
- (a) an engineered T cell, comprising: a nucleic acid encoding the TCR or antigen-binding fragment thereof of claims 1-27 that specifically binds to an antigen in a tumor; and
- 5 (b) either one or both of a checkpoint inhibitor and a protein that binds to a member of the transforming growth factor beta family (e.g., TGF- β).
53. A method of treating a tumor in a subject, the method comprising administering to the subject in need thereof
- 10 an engineered T cell, comprising: a nucleic acid encoding
- (a) the TCR or antigen-binding fragment thereof of claims 1-27 that specifically binds to an antigen in a tumor; and
- (b) a bifunctional trap protein that targets a checkpoint inhibitor and a member of the
- 15 transforming growth factor beta family (e.g., TGF- β).
54. The method of any one of claims 51-53, wherein the tumor is an EBV-associated tumor.
- 20 55. The method of claim 50 or 54, wherein the cancer or the EBV-associated tumor is Burkitt's lymphoma, immunosuppressive lymphoma, diffuse large B-cell lymphoma, diffuse large B-cell lymphoma associated with chronic inflammation, lymphomatoid granulomatosis, plasmablastic lymphoma, primary effusion lymphoma, post-transplant lymphoproliferative disorder, nasopharyngeal carcinoma, gastric adenocarcinoma, lymphoepithelioma-associated
- 25 carcinoma, immunodeficiency-related leiomyosarcoma, or Hodgkin's lymphoma.