

CLAIMS

1. A CAR-T cell, which comprises one or more chimeric antigen receptors (CARs) targeting one or more antigens expressed on a malignant T cell, wherein the CAR comprises the amino acid sequence

MALPVTALLLPLALLLHAARPDIQMTQTTSSLSASLGDRVTISCSASQGISNYLNW
YQQKPDGTVKLLIYYTSSLHSGVPSRFSGSGSGTDYSLTISNLEPEDIATYYCQ
QYSKLPYTFGGGKLEIKRGGGGSGGGGSGGGGSGGGGSEVQLVESGGGLVK
PGGSLKLSCAASGLTFSSYAMSWVRQTPEKRLEWVASISSGGFTYYPDSVKGR
FTISRDNARNILYLQMSSLRSEDAMYYCARDEVRGYLDVWGAGTTVTVSPR
ASTTTPAPRPPTPAPTIASQPLSLRPEACRPAAGGAVHTRGLDFACDFWVLVV
VGGVLACYSLLVTVAFIIFWVKRGRKKLLYIFKQPFMRPVQTTQEEDGCSCRF
PEEEEGGCELRVKFSRSADAPAYKQGQNQLYNELNLGRREEYDVLDKRRGRD
PEMGGKPRRKNPQEGLYNELQKDKMAEAYSEIGMKGERRRGKGHDGLYQGL
STATKDTYDALHMQALPPR,

wherein the CAR-T cell is deficient in a subunit of the T cell receptor complex and is deficient in CD7.

2. The CAR-T cell as recited in claim 1, wherein the subunit of the T cell receptor complex is chosen from TCR α , TCR β , TCR δ , TCR γ , CD3 ϵ , CD3 γ , CD3 δ , and CD3 ζ .
3. The CAR-T cell as recited in any of any of claims 1, 2, 10-13, for use in the treatment of cancer.
4. The CAR-T cell as recited in claim 23, wherein the cancer is a hematologic malignancy.
5. The CAR-T cell as recited in claim 4, wherein the hematologic malignancy is a T-cell malignancy.
6. The CAR-T cell as recited in claim 5, wherein the T cell malignancy is T-cell acute lymphoblastic leukemia (T-ALL).
7. The CAR-T cell as recited in claim 5, wherein the T cell malignancy is non-Hodgkin's lymphoma.
8. The CAR-T cell as recited in claim 5, wherein the T cell malignancy is T-cell chronic lymphocytic leukemia (T-CLL).
9. A chimeric antigen receptor (CAR)-comprising T cell (CAR-T cell) that is

deficient in a subunit of the T cell receptor complex and is deficient in CD7, comprising a CAR that specifically binds to CD7 antigen, wherein the CAR comprises:

- a CD8 α signal peptide comprising SEQ ID NO:1;
- a light chain variable region comprising SEQ ID NO: 21;
- a peptide linker comprising SEQ ID NO:9;
- a heavy chain variable region comprising SEQ ID NO: 20;
- a CD8 α hinge comprising SEQ ID NO:2;
- a CD28 transmembrane domain comprising SEQ ID NO:3;
- the costimulatory domain selected from 4-1BB, comprising SEQ ID NO: 5 and CD28, comprising SEQ ID NO: 6 and not a CD28 costimulatory domain; and
- a CD3 zeta signaling domain comprising SEQ ID NO:7.

10. The CAR-T cell as recited in claim 1, wherein the CAR is an amino acid sequence shown in SEQ ID NO. 32.

11. The CAR-T cell as recited in any of claims 1 or 2, wherein the chimeric antigen receptor (CAR) displays at least 95% sequence identity to an amino acid sequence chosen from SEQ ID NO:32, SEQ ID NO:33, SEQ ID NO:34, SEQ ID NO:35, SEQ ID NO:36, SEQ ID NO:37, SEQ ID NO:38 or SEQ ID NO:39.

12. The CAR-T cell as recited in claim 1, wherein the antigen expressed on a malignant T cell is chosen from CD2, CD3, CD4, CDS, CD7, TCR α , and TCR β .

13. A therapeutic composition comprising a population of CAR-T cells as recited in any of any of claims 1, 2, 10, 11, or 12 and at least one therapeutically acceptable carrier and/or adjuvant.

14. The CAR-T cell or therapeutic composition for use in the method as recited in claim 3, wherein the hematologic malignancy is acute myeloid leukemia (AML).

15. A therapeutic composition comprising a population of CAR-T cells as recited in claim 9 and at least one therapeutically acceptable carrier and/or adjuvant.

16. The CAR-T cell as recited in claim 9 or the therapeutic composition as recited in claim 15 for use in a method of treatment of cancer in a patient in need thereof.