

CLAIMS

What is claimed is:

1. A T cell comprising a chimeric antigen receptor (CAR-T cell), wherein the CAR-T cell is deficient in an antigen to which the chimeric antigen receptor specifically binds, and wherein the chimeric antigen receptor specifically binds an antigen expressed on a malignant T cell.
2. The CAR-T cell of claim 1, wherein the antigen is selected from the group consisting of CD7, CD5, CD2, CD30, and CD4.
3. The CAR-T cell of claim 1, wherein the antigen is CD7.
4. The CAR-T cell of any of the preceding claims, wherein the CAR-T cell further comprises a suicide gene.
5. The CAR-T cell of claim 4, wherein the suicide gene encodes a modified Human-Herpes Simplex Virus-1-thymidine kinase (TK) gene fused in-frame to the extracellular and transmembrane domains of the human CD34 cDNA.
6. The CAR-T cell of claim 1, further comprising a modification of the endogenous T-cell Receptor Alpha Chain (TRAC) such that endogenous T cell receptor mediated signaling is blocked in the CAR-T cell.
7. The CAR-T cell of claim 1, where in the CAR-T cell comprises a modification of CD7, and further comprises a modification of TRAC.
8. A method of killing a malignant T cell, the method comprising contacting the malignant T cell with a CAR-T cell of claim 1.
9. The method of claim 8, wherein the T cell malignancy is T-cell acute lymphoblastic leukemia (T-ALL).
10. The method of claim 8, wherein the T cell malignancy is non-Hodgkin lymphoma.

11. The method of claim 8, wherein the CAR-T cell is used to treat myeloid and lymphoid malignancies.
12. A method of treating a mammal having a T cell malignancy, the method comprising administering to the mammal a plurality of chimeric antigen receptor T (CAR-T) cells, each CAR-T cell comprising the same chimeric antigen receptor, wherein the CAR-T cells are deficient in an antigen to which the chimeric antigen receptor specifically binds, and wherein the chimeric antigen receptor specifically binds an antigen expressed on a malignant T cell.
13. The method of claim 12, wherein the antigen expressed on a malignant T cell is selected from the group consisting of CD7, CD5, CD2, CD30, and CD4.
14. The method of claim 13, wherein the antigen expressed on a malignant T cell is CD7.
15. The method of claim 12, wherein endogenous T cell receptor mediated signaling is blocked in the CAR-T cell.
16. The method of claim 13, wherein the CAR-T cells do not induce alloreactivity or graft-versus-host disease.
17. The method of claim 13, wherein the CAR-T cells do not induce fratricide.
18. The method of claim 12, wherein the T cell malignancy is T-cell acute lymphoblastic leukemia (T-ALL).
19. The method of claim 12, wherein the T cell malignancy is non-Hodgkin lymphoma.
20. The method of claim 12, wherein the CAR-T cell is used to treat myeloid and lymphoid malignancies.