CLAIMS

What is claimed is:

1. An immune cell comprising:

a) a chimeric antibody-T cell receptor (TCR) construct (caTCR) comprising:

i) an antigen binding module that specifically binds to a target antigen; and

ii) a T cell receptor module (TCRM) comprising a first TCR domain (TCRD) comprising a first TCR transmembrane domain (TCR-TM) and a second TCRD comprising a second TCR-TM, wherein the TCRM facilitates recruitment of at least one TCR-associated signaling molecule, wherein the caTCR further comprises a stabilization module comprising a first stabilization domain and a second stabilization domain, and wherein the stabilization module is selected from the group consisting of a C_H1-C_L module, a C_H2-C_H2 module, a C_H3- C_H3 module, and a C_H4-C_H4 module; and

b) a chimeric signaling receptor (CSR) comprising:

i) a ligand-binding module that is capable of binding or interacting with a target ligand;

ii) a transmembrane module; and

iii) a co-stimulatory immune cell signaling module that is capable of providing a co-stimulatory signal to the immune cell,

wherein the ligand-binding module and the co-stimulatory immune cell signaling module are not derived from the same molecule, and wherein the CSR lacks a functional primary immune cell signaling domain.

2. The immune cell of claim 1, wherein the CSR lacks any primary immune cell signaling sequences.

3. The immune cell of claim 1, wherein the target antigen is a cell surface antigen.

4. The immune cell of claim 1, wherein the target antigen is a complex comprising a peptide and a major histocompatibility complex (MHC) protein.

5. The immune cell of claim 1, wherein the first TCR-TM is derived from one of the transmembrane domains of a first T cell receptor and the second TCR-TM is derived from the other transmembrane domain of the first T cell receptor.

6. The immune cell of claim 5, wherein at least one of the TCR-TMs is non-naturally occurring.

7. The immune cell of claim 5, wherein the first T cell receptor is a γ/δ T cell receptor.

8. The immune cell of claim 1, wherein the antigen-binding module is multispecific.

9. The immune cell of claim 1, wherein the target antigen and the target ligand are the same.

10. The immune cell of claim 1, wherein the target antigen and the target ligand are different.

11. The immune cell of claim 10, wherein the target ligand is a ligand expressed on the surface of a cell presenting the target antigen.

12. The immune cell of claim 1, where the target ligand is a disease-associated ligand.

13. The immune cell of claim 12, wherein the target ligand is a cancer-associated ligand.

14. The immune cell of claim 1, wherein the ligand-binding module is an antibody moiety.

15. The immune cell of claim 1, wherein the transmembrane module of the CSR comprises transmembrane domains derived from CD28, CD3ε, CD3ζ, CD45, CD4, CD5, CD8, CD9, CD16, CD22, CD30, CD33, CD37, CD64, CD80, CD86, CD134, CD137, or CD154.

16. The immune cell of claim 1, wherein the co-stimulatory immune cell signaling module is derived from the intracellular domain of a co-stimulatory receptor of a TCR.

17. The immune cell of claim 16, wherein the co-stimulatory receptor is CD28.

18. The immune cell of claim 16, wherein the co-stimulatory receptor is 4-1BB.

19. The immune cell of claim 16, wherein the co-stimulatory receptor is OX40.

20. The immune cell of claim 16, wherein the co-stimulatory receptor is ICOS.

21. The immune cell of claim 16, wherein the co-stimulatory receptor is CD27.

22. The immune cell of claim 16, wherein the co-stimulatory receptor is CD30.

23. The immune cell of claim 16, wherein the co-stimulatory receptor is CD40.

24. One or more nucleic acids encoding the caTCR and CSR of claim 1, wherein the caTCR and CSR each consist of one or more polypeptide chains encoded by the one or more nucleic acids.

25. An immune cell comprising the one or more nucleic acids of claim 24.

26. An *in vitro* method of killing a target cell presenting a target antigen, comprising contacting the target cell with the immune cell of claim 1.

27. Use of the immune cell of claim 1 in the manufacture of a pharmaceutical composition for treating a target antigen-associated disease in an individual in need thereof, wherein the pharmaceutical composition comprises the immune cell of claim 1 and a pharmaceutically acceptable carrier.

28. Use of the immune cell of claim 1 in the manufacture of a medicament for killing a target cell presenting a target antigen, wherein the target cell is to be contacted with the immune cell.