CLAIMS

What is claimed is:

A composition comprising a population of modified T-cells,

wherein a plurality of modified T-cells of the population comprise a non-naturally occurring antigen receptor or a sequence encoding the same,

wherein at least 25% of the population of modified T-cells expresses one or more cell-surface marker(s) of a stem memory T cell (T_{SCM}) or a T_{SCM}-like cell; and wherein the one or more cell-surface marker(s) comprise CD45RA and CD62L.

2. The composition of claim 1, wherein at least 25% of the modified T cells of the population express one or more of CD127, CD45RO, CD95 and IL-2Rβ.

3. The composition of claim 1, wherein the non-naturally occurring antigen receptor is a non-naturally occurring T-Cell Receptor (TCR).

4. The composition of claim 3, wherein the non-naturally occurring T-cell receptor comprises one or more mutation(s) compared to a wild-type TCR.

5. The composition of claim 3, wherein the non-naturally occurring T-cell receptor is a recombinant TCR.

6. The composition of claim 1, wherein the non-naturally occurring antigen receptor is a Chimeric Antigen Receptor (CAR).

7. The composition of claim 6, wherein the CAR comprises

(a) an ectodomain comprising an antigen recognition region, wherein the antigen recognition region comprises one or more sequences that each specifically bind an antigen;

(b) a transmembrane domain, and

(c) an endodomain comprising at least one costimulatory domain.

8. The composition of claim 7, wherein the antigen recognition region comprises at least one of a single chain variable fragment (scFv), a single domain antibody, a VHH, an antibody mimetic, a protein scaffold or a Centyrin.

9. The composition of claim 7, wherein the antigen recognition region comprises at least one single chain variable fragment (scFv).

10. The composition of claim 7, wherein the antigen recognition region comprises at least one VHH.

11. The composition of claim 7, wherein the antigen recognition region comprises at least one Centyrin.

12. The composition of claim 1, wherein the plurality of modified T-cells of the population further comprise a genomic editing composition.

13. The composition of claim 12, wherein the genomic editing composition comprises a sequence encoding a DNA binding domain and a sequence encoding a nuclease domain.

14. The composition of claim 12, wherein the plurality of modified T-cells of the population further comprise a donor sequence composition.

15. The composition of claim 14, wherein the donor sequence composition comprises a sequence encoding the non-naturally occurring antigen receptor.

16. The composition of claim 15, wherein the sequence encoding the non-naturally occurring antigen receptor comprises a single-stranded or double-stranded DNA molecule.

17. The composition of claim 14, wherein the donor sequence composition is inserted into a specific site in the genome contacted with the composition by homologous recombination or by endogenous DNA repair mechanisms.

18. The composition of claim 1, wherein the plurality of modified T-cells of the population further comprise a transposon comprising a sequence encoding the non-naturally occurring antigen receptor.

19. The composition of claim 18, wherein the plurality of modified T-cells of the population further comprise a transposase composition comprising a transposase or a sequence encoding the transposase.

20. The composition of claim 19, wherein the transposase composition comprises a piggyBac transposase or a sequence encoding a piggyBac or piggyBac-like transposase.

21. The composition of claim 1, wherein a genomic safe harbor site comprises a sequence encoding the non-naturally occurring antigen receptor.

22. The composition of claim 1, wherein the composition further comprises a T-cell expansion composition.

23. The composition of claim 22, wherein the composition or the T-cell expansion composition comprises one or more of octanoic acid, nicotinamide, 2,4,7,9-tetramethyl-5-decyn-4,7-diol (TMDD), diisopropyl adipate (DIPA), n-butyl-benzenesulfonamide, 1,2-benzenedicarboxylic acid, bis(2-methylpropyl) ester, palmitic acid, linoleic acid, oleic acid, stearic acid hydrazide, oleamide, a sterol or an alkane.

24. The composition of claim 1, wherein at least 30% of the modified T-cells of the population express CD62L and CD45RA.

25. The composition of claim 1, wherein at least 30% of the modified T-cells of the population express one or more of CD127, CD45RO, CD95 and IL-2Rβ.

26. The composition of claim 1, wherein one or more of a stem cell-like T cell, a stem cell memory T cell (T_{SCM}) and a central memory T cell (T_{CM}) comprise at least 75% of the population of modified T-cells.

27. The composition of claim 1, wherein central memory T cells (T_{CMs}) comprise at least 15% of the population of modified T-cells.

28. The composition of claim 1, further comprising a T-cell activator composition comprising one or more of an anti-human CD3 monospecific tetrameric antibody complex, an anti-human CD28 monospecific tetrameric antibody complex and an anti-human CD2 monospecific tetrameric antibody complex.

29. The composition of claim 28, comprising a plurality of activated and modified T-cells.

30. The composition of claim 1, wherein at least 40% of the modified T-cells of the population express CD62L and CD45RA.