CLAIMS

1. An engineered chimeric antigen receptor polynucleotide, the polynucleotide encodes for a chimeric antigen receptor polypeptide comprising: a signal peptide, an antigen recognition domain, a hinge region, a transmembrane domain, at least one co-stimulatory domain, and a signaling domain; and

wherein the antigen recognition domain is selected from the group consisting of CD2, CD3, CD4, CD5, CD7, CD8, and CD52.

2. The engineered chimeric antigen receptor polynucleotide according to claim 106, wherein said antigen recognition domain is CD3.

3. The engineered chimeric antigen receptor polynucleotide according to claim 106, wherein said antigen recognition domain is CD4.

4. The engineered chimeric antigen receptor polynucleotide according to claim 106, wherein said antigen recognition domain is CD5.

5. The engineered chimeric antigen receptor polynucleotide according to claim 106, wherein said antigen recognition domain is CD7.

6. A method of reducing the number of CD4 positive T cell leukemia cells or CD4 positive T cell lymphoma cells, the method comprising the steps of:

i. contacting CD4 positive T cell leukemia cells or CD4 positive T cell lymphoma cells with an effective amount of an engineered cell comprising a polynucleotide that encodes for chimeric antigen receptor polypeptide comprising: a signal peptide, a CD4 antigen recognition domain, a hinge region, a transmembrane domain, at least one co-stimulatory domain, and a signaling domain; and

ii. optionally, assaying for CD4 positive T leukemia cells or CD4 positive lymphoma cells.

7. The method of reducing the number of CD4 positive T cell leukemia cells or CD4 positive T cell lymphoma cells according to claim 6, wherein said engineered cell is selected from the group consisting of CD4 T-cells, CD8 T-cells, Natural Killer cells, and NKT cells.

8. Use of an engineered cell comprising a polynucleotide that encodes for chimeric antigen receptor polypeptide comprising: a signal peptide, a CD4 or CD5 antigen recognition domain, a hinge region, a transmembrane domain, at least one co-stimulatory domain, and a signaling domain in the manufacture of a medicament for treating a CD4 or CD5 associated cell proliferative disease in a patient in need thereof, wherein said medicament is to be administered to the patient; and

optionally, assaying for CD4 or CD5 positive cells associated with the cell proliferative disease.

9. The use according to claim 8, wherein cell proliferative disease is a CD4 associated cell proliferative disease.

10. The use according to claim 9, wherein the CD4 associated cell proliferative disease is selected from the group consisting of CD4 positive leukemia and CD4 positive lymphoma.

11. The use according to claim 11, wherein said cell proliferative disease is CD4 positive acute myeloid leukemia.

12. The use according to claim 11, wherein said cell acute myeloid leukemia is acute myeloid leukemia M4 or acute myeloid leukemia M5.

13. The use according to claim 9 wherein said engineered cell is selected from the group consisting of CD4 T-cells, CD8 T-cells, Natural Killer cells, or NKT cells.

14. The use according to claim 8, wherein cell proliferative disease is a CD5 associated cell proliferative disease.

15. The use according to claim 14, wherein the CD5 associated cell proliferative disease is selected from the group consisting of thymic carcinoma, non-Hodgkin's lymphoma, diffuse large cell lymphoma, small lymphocytic lymphoma (SLL), T-cell neoplasms, peripheral T-cell lymphoma, mantle cell lymphoma, T-cell acute lymphoblastic leukemia (T-ALL), and chronic lymphoid leukemia(CLL).

16. The use according to claim 14, wherein said engineered cell is selected from the group consisting of CD4 T-cell, CD8 T-cell, Natural Killer cell, or NKT cell.

17. The use according to claim 8, wherein the polynucleotide comprises SEQ ID NO. 4 or SEQ ID NO. 5.

18. The use according to claim 8, wherein the medicament is to be further administered in conjunction with one or more of chemotherapy, radiation, immunosuppressive agents, and antiviral therapy.

19. The use according to claim 14, wherein the polynucleotide comprises SEQ ID NO. 6 or SEQ ID NO. 7.

20. The use according to claim 14, wherein the medicament is to be administered in conjunction with one or more of chemotherapy, radiation, immunosuppressive agents, and antiviral therapy.