

CLAIMS:

1. An isolated or purified chimeric antigen receptor (CAR) directed against CD19, which comprises an amino acid sequence of SEQ ID NO: 1, SEQ ID NO: 2, SEQ ID NO: 3, SEQ ID NO: 4, SEQ ID NO: 5, SEQ ID NO: 6, SEQ ID NO: 7, SEQ ID NO: 8, SEQ ID NO: 9, SEQ ID NO: 10, SEQ ID NO: 11, SEQ ID NO: 12, or SEQ ID NO: 13.
2. An isolated or purified chimeric antigen receptor (CAR) comprising the following elements that are present in SEQ ID NO: 4 or SEQ ID NO: 9: (i) the extracellular spacer, (ii) the transmembrane domain derived from a human CD8 α molecule, and (iii) the intracellular T-cell signaling domains derived from (a) one or both of a human CD28 molecule and a human CD27 molecule, and (b) a human CD3 ζ molecule.
3. An isolated or purified chimeric antigen receptor (CAR) comprising the following elements that are present in SEQ ID NO: 10 or SEQ ID NO: 11: (i) the extracellular spacer, (ii) the transmembrane domain derived from a human CD8 α molecule, and (iii) the intracellular T-cell signaling domains derived from (a) one or both of a human CD28 molecule and a human CD27 molecule, and (b) the gamma chain of Fc ϵ RI.
4. An isolated or purified chimeric antigen receptor (CAR) comprising the following elements that are present in SEQ ID NO: 12 or SEQ ID NO: 13: (i) the extracellular spacer, (ii) the transmembrane domain derived from a human CD8 α molecule, and (iii) the intracellular T-cell signaling domains derived from a human CD28 molecule and the gamma chain of Fc ϵ RI.
5. An isolated or purified nucleic acid encoding the CAR of any one of claims 1-4.
6. A vector comprising the isolated or purified nucleic acid of claim 5.
7. An isolated T-cell or NK cell comprising the vector of claim 6.
8. An isolated T-cell or NK cell of claim 7 for use in preventing or treating a B-cell malignancy in a subject.

9. A method of destroying malignant B-cells in vitro, which method comprises contacting one or more of the isolated T-cells or NK cells of claim 7 with a population of malignant B-cells cells that express CD19, whereby the CAR binds to CD19 on the malignant B-cells and the malignant B-cells are destroyed.

10. The method of claim 9, wherein the malignant B-cells are lymphoma cells.

11. The method of claim 9, wherein the malignant B-cells are leukemia cells.

12. A method of making a cell expressing a chimeric antigen receptor (CAR), the method comprising introducing a vector encoding the CAR of any one of claims 1-4 into a T-cell or NK cell.