CLAIMS

What is claimed is:

1. A recombinant nucleic acid, comprising:

   a T7 promoter sequence portion, a 5' untranslated (5'-UTR) sequence portion, a signal peptide sequence portion, a single chain antibody fragment sequence portion, a hinge region sequence portion, a transmembrane domain sequence portion, and one or more intracellular domain sequence portions; and

   wherein the nucleic acid comprises any one of SEQ ID NO: 1, SEQ ID NO: 2, SEQ ID NO: 3, or SEQ ID NO: 4.

2. The recombinant nucleic acid of claim 1, wherein the hinge sequence portion provides range of motion for the single chain antibody fragment sequence portion.

3. The recombinant nucleic acid of claim 1, wherein the transmembrane domain sequence portion enables insertion of a transmembrane domain encoded by the transmembrane domain sequence portion into a membrane.

4. The recombinant nucleic acid of claim 1, wherein the intracellular domain sequence portion comprises CD28 and/or CD3ζ.

5. The recombinant nucleic acid of claim 1, wherein the intracellular domain sequence portion comprises CD28 and/or FcεRIγ.

6. The recombinant nucleic acid of claim 1, wherein the intracellular domain sequence portion provides enhanced cytotoxic activity against tumor cells.

7. The recombinant nucleic acid of claim 1, wherein the recombinant nucleic acid is in a vector.

8. The recombinant nucleic acid of claim 1, further comprising a sequence portion encoding CD16a.

9. The recombinant nucleic acid of claim 1, further comprising a sequence portion encoding ER-IL2.

10. A method of generating CAR-NK cells, comprising: transfecting a primary NK cell with a recombinant nucleic acid of any one of claims 1-9.

11. A recombinant cell comprising the recombinant nucleic acid of any one of claims 1-9, wherein the cell is a bacterial cell or wherein the cell is an autologous NK cell, or wherein the NK cell is genetically modified.