CLAIMS

What is claimed is:

1. An immune cell that expresses a peptide, wherein the peptide comprises:
   a) a single-chain variable fragment (scFv) domain;
   b) a fragment crystallizable (Fc) domain; and
   c) a hinge domain joining the scFv and Fc domains.

2. The immune cell of Claim 1, wherein the scFv domain comprises an immunoglobulin variable light (V_L) domain, an immunoglobulin variable heavy (V_H) domain, and a linker domain joining the V_L and V_H domains.

3. The immune cell of Claim 2, wherein the linker domain is $(G_4S)_x$, wherein x is an integer from 1 to 100.

4. The immune cell of Claim 3, wherein the linker domain is $(G_4S)_3$.

5. The immune cell of any one of Claims 1 through 4, wherein the scFv domain binds CD19.

6. The immune cell of any one of Claims 1 through 4, wherein the scFv domain binds CD20.

7. The immune cell of any one of Claims 1 through 4, wherein the scFv domain binds CD22, CD38, CD7, CD2, CD3, epidermal growth factor receptor (EGFR), CD123, CD33, B-cell maturation antigen (BCMA), mesothelin, human epidermal growth factor receptor 2 (Her2), prostate-specific membrane antigen (PSMA), disialoganglioside (GD2), PD-L1 (CD274), CD80 or CD86.

8. The immune cell of any one of Claims 1 through 4, wherein the Fc domain comprises an immunoglobulin constant heavy 2 (C_H2) domain and an immunoglobulin constant heavy 3 (C_H3) domain.

9. The immune cell of any one of Claims 1 through 4, wherein the Fc domain is human IgG1 Fc domain.

10. The immune cell of any one of Claims 1 through 4, wherein the peptide further comprises a signal peptide that is N-terminal to the scFv domain.

11. The immune cell of any one of Claims 1 through 4, wherein the peptide further comprises a self-cleaving peptide joining the Fc domain to a chimeric receptor, wherein the chimeric receptor comprises a receptor domain, a hinge and transmembrane domain, a co-stimulatory signaling domain, and a cytoplasmic signaling domain.

12. The immune cell of Claim 11, wherein the self-cleaving peptide is a 2A peptide.

13. The immune cell of Claim 11, wherein the receptor domain is CD16.

14. The immune cell of Claim 11, wherein the hinge and transmembrane domain is a CD8α hinge and transmembrane domain.

15. The immune cell of Claim 11, wherein the co-stimulatory domain is 4-1BB co-stimulatory domain.

16. The immune cell of Claim 11, wherein the cytoplasmic signaling domain is a CD3ζ cytoplasmic signaling.

17. The immune cell of Claim 11, wherein the chimeric receptor is CD16V-4-1BB-CD3ζ.

18. The immune cell of any one of Claims 1 through 4, wherein the scFv domain binds CD19 or CD20, the Fc domain is a human IgG1 Fc domain, and the hinge domain is an IgG1 hinge domain; the peptide further comprising a CD8α signal peptide that is N-terminal to the scFv domain; the peptide further comprising a chimeric receptor that is CD16V-4-1BB-CD3ζ.

19. The immune cell of any one of Claims 1 through 4, wherein the peptide further comprises one or more of the following mutations: S239D; S267E; H268F; or I332E.

20. The immune cell of any one of Claims 1 through 4, wherein the peptide further comprises one or more of the following mutations: E345K; E430G; or S440Y.

21. The immune cell of any one of Claims 1 through 4, wherein the peptide further comprises IL-15 joined to the Fc domain by a linker.

22. The immune cell of Claim 21, wherein the linker that joins IL-15 to the Fc domain is selected from the group consisting of SEQ ID NO: 51; $A(EAAK)_4ALEA(EAAAK)_4A$; $(EAAAK)_z$; $A(EAAAK)_zA$; and $(XP)_w$, wherein z is an integer from 1 to 100; X is any amino acid, and w is an integer from 1 to 100.

23. The immune cell of any one of Claims 1 through 4, wherein the peptide further comprises a ligand that binds 4-1BB (CD37), CD28, or OX40 (CD134) joined to the Fc domain by a linker.

24. The immune cell of Claim 23, wherein the linker that joins IL-15 to the Fc domain is selected from the group consisting of SEQ ID NO: 51; $A(EAAK)_4ALEA(EAAAK)_4A$; $(EAAAK)_z$; $A(EAAAK)_zA$; and $(XP)_w$, wherein z is an integer from 1 to 100; X is any amino acid, and w is an integer from 1 to 100.

25. The immune cell of any one of Claims 1 through 4, wherein the immune cell is a natural killer cell.

26. The immune cell of any one of Claims 1 through 4, wherein the immune cell is a T lymphocyte cell.