CLAIMS

What is claimed is:

1. A natural killer (NK) cell that expresses all or a functional portion of interleukin-15 (IL-15).

2. The NK cell of claim 1 wherein the IL-15 is expressed as a membrane-bound polypeptide and/or as a secreted polypeptide.

3. The NK cell of any one of claims 1 and 2 wherein all or a functional portion of the IL-15 is fused to all or a portion of a transmembrane protein.

4. A method of producing a natural killer (NK) cell that expresses all or a functional portion of interleukin-15 (IL-15) comprising:

    a) introducing nucleic acid encoding all or a functional portion of IL-15 into the NK cell; and

    b) maintaining the NK cell under conditions in which all or a functional portion of the IL-15 is expressed,

    thereby producing a NK cell that expresses all or a functional portion of IL-15.

5. The method of claim 4 wherein the nucleic acid introduced into the NK cell comprises a signal peptide of CD8α, all or a functional portion of IL-15 and all or a portion of a transmembrane domain of CD8α.

6. The method of any one of claims 4 and 5 wherein the NK cell is transduced with a vector that expresses all or a functional portion of the IL-15 linked (e.g., fused) to all or a portion of the transmembrane domain.

7. The method of claim 6 wherein the vector is a viral vector.

8. A natural killer (NK) cell produced by the method of any one of claims 4-7.

9. A composition comprising the NK cell of any one of claims 1-3 or 8.

10. A pharmaceutical composition comprising the NK cell of any one of claims 1-3 or 8.

11. The pharmaceutical composition of claim 10 further comprising all or a functional portion of IL-2.

12. Use of a natural killer (NK) cell that expresses all or a functional portion of interleukin-15 (IL-15) in the manufacture of a medicament for the treatment of cancer.

13. The use of claim 12 wherein the cancer is a leukemia (e.g., acute lymphoblastic leukemia; acute myeloid leukemia; chronic myelogenous leukemia, chronic lymphocytic leukemia), a myelodysplastic syndrome, a lymphoma (e.g., B cell non-Hodgkin lymphoma, Hodgkin lymphoma, T-cell lymphoblastic lymphoma, anaplastic large cell lymphoma), a solid tumor (e.g., a breast cancer, prostate cancer, gastric cancer, colon cancer, hepatocellular carcinoma, nasopharyngeal carcinoma, neuroblastoma, high grade glioma), a sarcoma (e.g., Ewing sarcoma, rhabdomyosarcoma, non-rhabdomyosarcoma soft-tissue sarcoma, osteosarcoma).

14. The use of any one of claims 12 and 13 further comprising administering IL-2 to the individual.

15. The use of any one of claims 12-14 further comprising administering one or more antibodies directed against the cancer to the individual.

16. A method of enhancing expansion and/or survival of NK cells comprising:

    a) introducing nucleic acid encoding all or a functional portion of IL-15; and

    b) maintaining the NK cells under conditions in which all or a functional portion of the IL-15 is expressed and the NK cells proliferate,

thereby enhancing expansion and/or survival of the NK cells.

17. The method of claim 16 wherein the nucleic acid introduced into the NK cell comprises a signal peptide of CD8α, all or a functional portion of IL-15 and all or a portion of a transmembrane domain of CD8α.

18. The method of any one of claims 16 and 17 wherein the NK cell is transduced with a vector that expresses all or a functional portion of the IL-15 linked (e.g., fused) to all or a portion of the transmembrane domain.

19. The method of claim 18 wherein the vector is a retroviral vector.

20. The method of any one of claims 16-19 further comprising contacting the NK cells with IL-2.