WHAT IS CLAIMED IS:

1. A method for increasing the number of NK cells, comprising,

contacting at least one NK cell with at least one NK-stimulating exosome comprising one or more stimulatory peptides present in an exosome membrane, wherein the exosome is an extracellular product of exosome-secreting cells.

2. The method of Claim 1, wherein the one or more stimulatory peptides are selected from the group consisting of 4-1BBL, IL-2, IL-12, IL-18, IL-21, MICA/B, ULBP2, ICAM-1, 2B4, BCM1/SLAMF2, CD155, CD112, CCR7, DAP12, and DAP10.

3. The method of Claim 1, wherein the one or more stimulatory peptides are coupled to a membrane-inserting peptide.

4. The method of Claim 3, wherein the membrane-inserting peptide comprises a fused peptide that is capable of membrane insertion, with affinity for a lipid bilayer, and wherein said fused peptide comprises a segment of IG4, CD4, or a combination thereof.

5. The method of Claim 3, wherein the one or more stimulatory peptides coupled to a membrane-inserting peptide is a fusion protein encoded by recombinant DNA.

6. The method of Claim 3, wherein the membrane-inserting peptide comprises human Fc, GPI, trans-membrane T-cell receptor, or pHLIP.

7. The method of Claim 1, wherein the NK cells are present in a population of unselected peripheral blood mononuclear cells (PBMCs).

8. The method of Claim 1, wherein the exosome is produced by cell lines engineered for improved expression of exosomes.

9. The method of Claim 1, wherein the NK cells are contacted to the NK-stimulating exosomes *in vitro*, *in vivo*, or *ex vivo*.

10. The method of Claim 9, wherein the NK cells are expanded *in vivo* in the intraperitoneal cavity, subcutaneously, or intravenously in the epidural space

11. The method of Claim 9, wherein the NK cells are contacted to the NK-stimulating exosomes in an allogeneic transplant procedure, a haploidentical transplant procedure, or an *in vivo* immunotherapy procedure.

12. The method of Claim 11, wherein the use of NK-stimulating exosomes in allogeneic transplants, haploidentical transplants, or in vivo immunotherapy does not cause graft-versus-host-disease (GVHD).

13. A method for treating cells susceptible to NK mediated lysis, comprising administering an effective amount of a composition comprising NK cells contacted according to the method of Claim 1.

14. The method of Claim 13, wherein the cells susceptible to NK mediated lysis are infected with a virus.

15. The method of Claim 13, wherein the cells susceptible to NK mediated lysis comprise AML, breast, bladder, colon and rectum, kidney, lung, prostate, thyroid, and uterine cancer

16. A method for lowering the risk of relapse after stem cell transplantation, comprising administering an effective amount of a composition comprising NK cells contacted according to the method of Claim 1.

17. A method of producing NK cell-stimulating exosomes, comprising, embedding one or more stimulatory peptides in the membrane of an exosome.

18. The method of Claim 17, wherein the one or more stimulatory peptides are selected from the group consisting of 4-1BBL, IL-2, IL-12, IL-18, IL-21, MICA/B, ULBP2, ICAM-1, 2B4, BCM1/SLAMF2, CD155, CD112, CCR7, DAP12, and DAP10.

19. The method of Claim 17, wherein the one or more stimulatory peptides are coupled to a membrane-inserting peptide.

20. The method of Claim 19, wherein the membrane-inserting peptide comprises CD4 or an IgG with affinity for a lipid bilayer.

21. The method of Claim 19, wherein the one or more stimulatory peptides coupled to a membrane-inserting peptide is a fusion protein encoded by recombinant DNA.

22. The method of Claim 19, wherein the membrane-inserting peptide comprises human Fc, GPI, trans-membrane T-cell receptor, or pHLIP.

23. The method of Claim 17, wherein the NK cell-stimulating exosomes are from cell lines engineered for improved expression of exosomes.

24. A method for treating cancer, comprising administering an effective amount of a composition comprising NK-stimulating exosomes comprising one or more stimulatory peptides.

25. A method for treating cancer, comprising (a) contacting NK stimulating exosomes comprising one or more stimulatory peptides to NK cells *ex vivo* to obtain a contacted NK cell population; and (b) administering the contacted NK cell population to a subject.

26. A composition comprising NK stimulating exosomes comprising 4-1BBL and IL-21 stimulatory peptides.

27. The composition of Claim 26, further comprising one or more stimulatory peptides selected from the group consisting of 4-1BBL, IL-2, IL-12, IL-18, MICA/B, ULBP2, ICAM-1, 2B4, BCM1/SLAMF2, CD155, CD112, CCR7, DAP12, and DAP10.

28. The composition of Claim 26, wherein the one or more stimulatory peptides are coupled to a membrane-inserting peptide.

29. The composition of Claim 28, wherein the membrane-inserting peptide comprises a segment of CD4, IgG, or a combination thereof, with affinity for a lipid bilayer.

30. The composition of Claim 28, wherein the one or more stimulatory peptides coupled to a membrane-inserting peptide is a fusion protein encoded by recombinant DNA.

31. The composition of Claim 28, wherein the membrane-inserting peptide comprises human Fc, GPI, trans-membrane T-cell receptor, or pHLIP.

32. The composition of Claim 26, wherein the NK stimulating exosomes are from cell lines engineered for improved expression of exosomes.

33. The composition of Claim 26, further comprising a pharmaceutical carrier.

34. A method for modifying NK cell function comprising, contacting at least one NK cell with at least one NK-stimulating exosome wherein the NK-stimulating exosome is loaded with a functional nucleic acid that modifies NK cell function.

35. The method of claim 34, wherein the functional nucleic acid comprises a microRNA (miRNA), RNAi, or a combination thereof.