WHAT IS CLAIMED IS:

1. Use of an NK cell-stimulating exosome for preparing a composition for increasing the number of NK cells, comprising,

   obtaining at least one NK cell-stimulating exosome from an exosome-secreting cell, wherein the exosome is an extracellular product of the exosome-secretory cell line selected from K562-mb15-4-1BBL and K562-mb21-41BBL and comprises a fusion protein comprising one or more NK cell stimulatory peptides comprising at least 41BBL and/or IL21 NK cell stimulatory peptides , said NK cell stimulatory peptides being coupled to a membrane-inserting peptide selected from a segment of IgG, a segment of CD4, human Fc, GPI, trans-membrane T-cell receptor, pHLIP; and

   contacting at least one NK cell *in vitro* or *ex vivo* with at least one NK-stimulating exosome.

2. The use of Claim 1, wherein the NK cell-stimulating exosome further comprises one or more additional stimulatory peptides are selected from the group consisting of 4-1BBL, IL-7, IL-2, IL-12, IL-18, IL-21, MICA/B, ULBP2, ICAM-1, 2B4, BCM1/SLAMF2, CD155, CD112, CCR7, DAP12, and DAP10.

3. The use of Claim 1, wherein the fusion protein is encoded by a recombinant or transgenic DNA molecule.

4. The use of Claim 3, further comprising preparing the fusion protein by introducing to the exosome-secreting cell the recombinant or transgenic DNA molecule.

5. The use of Claim 1, wherein the one or more stimulatory peptides coupled to a membrane-inserting peptide comprise a fusion protein encoded by recombinant DNA.

6. The use of Claim 1, wherein the NK cells are present in a population of cells obtained from unselected peripheral blood mononuclear cells (PBMCs), umbilical cord blood, lymphoid tissues, tumor infiltrated cells; NK cells derived from iPSCs or ESCs; or any combination thereof.

7. The use of Claim 1, wherein the exosome-secreting cell is obtained from a genetically engineered cell line which exhibits improved expression or formation of exosomes.

8. The use of Claim 1, wherein the contacting of the NK cells comprises contacting *in vivo* in the intraperitoneal cavity, subcutaneously, or intravenously in the epidural space.

9. The use of Claim 1, wherein the contacting comprises contacting the NK cell-stimulating exosomes in an allogeneic transplant procedure, a haploidentical transplant procedure, or an *in vivo* immunotherapy procedure.

10. The use of Claim 9, in an allogeneic transplant, a haploidentical transplant, or an *in vivo* immunotherapy to avoid or prophylaxis of acute or chromic graft-versus-host-disease (GVHD).

11. The use of claim 1, wherein the composition comprises a plurality of NK cells for preparing a composition to treat cancer cells susceptible to NK cell mediated lysis.

12. The use of Claim 11, wherein the cells susceptible to NK mediated lysis are infected with a virus.

13. The use of Claim 11, wherein the cancer cells susceptible to NK mediated lysis comprise cells of a cancer selected from a leukemia a lymphoma, breast cancer, bladder cancer, colon and rectum cancer, kidney cancer, lung cancer, prostate cancer, thyroid cancer, brain cancer, ovarian cancer , an osteosarcoma, a melanoma, a glioma, and uterine cancer.

14. The use of claim 1, wherein the composition comprises a plurality of NK cells for preparing a composition to lower the risk of relapse after stem cell transplantation.

15. A method of producing NK cell-stimulating exosomes, comprising, embedding one or more stimulatory peptides in the membrane of an exosome wherein the exosome is an extracellular product of an exosome secretory cell line selected from K562-mb15-4-1BBL and K562-mb21-41BBL, wherein the one or more stimulatory peptide is fused to a membrane-inserting peptide with affinity for a lipid bilayer; and wherein the one or more stimulatory peptides comprise at least 41BBL and/or IL21 NK cell stimulatory peptides.

16. The method of Claim 15, wherein the NK cell-stimulating exosome further comprises one or more additional 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.

17. The method of Claim 15, wherein the stimulatory peptide and the membrane-inserting peptide comprise a fusion protein encoded by a recombinant or transgenic DNA molecule.

18. The method of Claim 17, wherein the membrane-inserting peptide comprises a peptide selected from a segment of CD4, a segment of IgG, human Fc, GPI, trans-membrane T-cell receptor, pHLIP, and any combination thereof .

19. The method of Claim 17, wherein the one or more stimulatory peptides coupled to a membrane-inserting peptide is a fusion protein encoded by recombinant DNA.

20. The method of Claim 17, wherein the membrane-inserting peptide comprises human Fc, GPI, trans-membrane T-cell receptor, or pHLIP.

21. The method of Claim 15, wherein the exosome is obtained from an exosome-secreting cell from a genetically engineered cell line which exhibits improved expression of exosomes.

22. Use of a composition comprising NK-stimulating exosomes comprising one or more stimulatory peptides fused to a membrane-inserting peptide with affinity for a lipid bilayer, for the manufacture of a composition for treating cancer; wherein the exosome is an extracellular product of an exosome secretory cell line selected from K562-mb15-4-1BBL and K562-mb21-41BBL; and wherein the one or more stimulatory peptides comprise at least 41BBL and/or IL21 NK cell stimulatory peptides.

23. The use of Claim 22 , wherein the use comprises (a) contacting NK cells *ex vivo* with the composition comprising NK-stimulating exosomes to obtain a contacted NK cell population; and (b) using a composition comprising the contacted NK cell population to prepare a composition for treating the cancer.

24. A composition comprising NK stimulating exosomes comprising a fusion protein comprising 4-1BBL or IL-21 stimulatory peptides coupled to a membrane-inserting peptide selected from a segment of IgG, a segment of CD4, human Fc, GPI, trans-membrane T-cell receptor, pHLIPwherein the exosome is an extracellular product of an exosome secretory cell line selected from K562-mb15-4-1BBL and K562-mb21-41BBL.

25. The composition of Claim 24, further comprising one or more stimulatory peptides selected from the group consisting of IL-2, IL-12, IL-18, MICA/B, ULBP2, ICAM-1, 2B4, BCM1/SLAMF2, CD155, CD112, CCR7, DAP12, and DAP10.

26. The composition of Claim 24, wherein the fusion protein is encoded by a recombinant or transgenic DNA molecule.

27. The composition of Claim 26, wherein the fusion protein is obtained from an exosome-secreting cell comprising the recombinant or transgenic DNA molecule.

28. The composition of Claim 26, wherein the exosome-secreting cell line is K562-mb15-41BBL, K562-mb21-41BBL.

29. The composition of Claim 26, wherein the membrane-inserting peptide comprises a segment of CD4 or an IgG with affinity for a lipid bilayer.

30. The composition of Claim 24, wherein the NK stimulating exosomes are obtained from a genetically engineered cell line which exhibits improved expression of exosomes.

31. The composition of Claim 24, further comprising a pharmaceutical carrier.

32. Use of the composition of claim 24 for modifying NK cell function, the use comprising, contacting in vitro or ex vivo at least one NK cell with the composition of claim 24, wherein the NK-stimulating exosomes further comprise a microRNA (miRNA), a siRNA, a shRNA, an antisense nucleic acid, an aptamer, a ribozyme, and/or an external guide sequence capable of stimulating NK cell cytotoxic function.