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 line, wherein the exosome is an extracellular product of the exosome-secretory cell line K562-mb21-41BBL and comprises a fusion protein comprising one or more NK cell stimulatory peptides comprising at least 41BBL and IL-21, wherein each of 41BBL and IL-21 is coupled to a membrane-inserting peptide selected from a segment of IgG, a segment of CD4, human Fc, GPI, trans-membrane T-cell receptor, and pHLIP; and

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

2. The use of Claim 1, wherein the NK cell-stimulating exosome further comprises one or more additional stimulatory peptides selected from IL-7, IL-2, IL-12, IL-18, 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 the recombinant or transgenic DNA molecule into the exosome-secreting cell line.

5. 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.

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

7. The use of Claim 6, wherein the cells susceptible to NK mediated lysis are infected with a virus.

8. The use of Claim 6, wherein the cells susceptible to NK cell 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.

9. 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.

10. 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 the exosome secreting cell line K562-mb21-41BBL, wherein the one or more stimulatory peptides are 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 IL-21.

11. The method of Claim 10, wherein the NK cell-stimulating exosome further comprises one or more additional 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.

12. The method of Claim 10, wherein the one or more stimulatory peptide fused to the membrane-inserting peptide comprise a fusion protein encoded by a recombinant or transgenic DNA molecule.

13. The method of Claim 12, 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.

14. The method of Claim 12, wherein the membrane-inserting peptide comprises human Fc, GPI, trans-membrane T-cell receptor, or pHLIP.

15. A composition comprising NK cell-stimulating exosomes, wherein the NK cell-stimulating exosomes comprise a first fusion protein comprising 41BBL coupled to a membrane-inserting peptide and a second fusion protein comprising IL-21 coupled to a membrane-inserting peptide, wherein the membrane-inserting protein is selected from a

segment of IgG, a segment of CD4, human Fc, GPI, trans-membrane T-cell receptor, and pHLIP, wherein the exosome is an extracellular product of the exosome secreting cell line K562-mb21-41BBL.

16. The composition of Claim 15, 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.

17. The composition of Claim 15, wherein the first and second fusion proteins are encoded by a recombinant or transgenic DNA molecule.

18. The composition of Claim 17, wherein the membrane-inserting peptide comprises a segment of CD4 or a segment of IgG with affinity for a lipid bilayer.

19. The composition of Claim 15, further comprising a pharmaceutical carrier.