V. CLAIMS

What is claimed is:

1. A method for increasing the number of memory-like NK cells comprising a) preactivating NK cells by contacting at least one NK cell with at least one or more stimulatory cytokines; and b) expanding the preactivated NK cells of step a) by contacting said cells with PM21 particles, EX21 exosomes, or FC21 feeder cells.

2. The method of claim 1, wherein the NK cells are obtained from an unselected population of peripheral blood mononuclear cells.

3. The method of claim 1, wherein the at least one or more stimulatory cytokines is selected from the group consisting of IL-12, IL-15, and IL-18.

4. The method of claim 3, wherein the method comprising contacting the NK cell with 3 stimulatory cytokines.

5. The method of claim 3, further comprising contacting the NK cell with a cytokine selected from the group consisting of 4-1BBL, IL-2, IL-21, MICA/B, ULBP2, ICAM-1, 2B4, BCM1/SLAMF2, CD155, CD112, Jagged1, Jagged2, Delta-like1 (Dll1), Delta-like 3 (Dll3), Delta-like 4(Dll4), Pref-1, DNER, Jedi, SOM-11, wingless, CCN3, MAGP2, MAGP1, TSP2, YB-1, EGFL7, CCR7, DAP12, and DAP10.

6. The method of claim 1, wherein the NK cells are contacted with the IL-12, IL-15, or IL-18 in vitro, in vivo, or ex vivo.

7. The method of claim 1, wherein the NK cells are contacted with the one or more stimulatory cytokines for between about 6 to about 24 hours .

8. The method of claim 1, wherein the PM21 particles, EX21 exosomes, or FC21 feeder cells comprise one or more stimulatory peptides coupled to a membrane-inserting peptide.

9. The method of Claim 8, wherein the membrane-inserting cytokine 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.

10. The method of Claim 8, wherein the one or more stimulatory cytokines coupled to a membrane-inserting peptide is a fusion protein encoded by recombinant DNA.

11. The method of Claim 8, wherein the membrane-inserting peptide comprises human Fc, GPI, trans-membrane T-cell receptor, or pHLIP.

12. The method of Claim 8, 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, Jagged1, Jagged2, Delta-like1 (Dll1), Delta-like 3 (Dll3), Delta-like 4(Dll4), Pref-1, DNER, Jedi, SOM-11, wingless, CCN3, MAGP2, MAGP1, TSP2, YB-1, EGFL7, CCR7, DAP12, and DAP10.

13. The method of claim 1, wherein the NK cells are contacted with the PM21 particles, EX21 exosomes, or FC21 feeder cells in vitro, in vivo, or ex vivo

14. The method of claim 1, wherein the NK cells of step a are contacted with PM21 particles, EX21 exosomes, or FC21 feeder cells for 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 45, or 60 days.

15. The method of claim 1, further comprising resting the expanded memory-like NK cells following step b).

16. The method of claim 15, wherein the cells are memory-like NK cells are rested for at least (between/no more than) 1, 2, 3, 4 or 5 days.

17. The method of claim 1, wherein the source of NK cells is an NK cell progenitor source, wherein the NK cell progenitor source is selected from the group consisting of cord blood, induced pluripotent stem cells, and embryonic stem cells.

18. A kit for increasing the number of memory-like NK cells comprising one or more cytokine and one or more vesicle comprising an NK cell effector agent.

19. The kit of claim 18, wherein the one or more cytokines is selected from the group consisting of IL-12, IL-15, and IL-18.

20. The kit of claim 18, wherein the one or more vesicles comprising an NK cell effector agent is a PM21 particle, EX21 exosome, or FC21 feeder cell.

21. The kit of claim 20, wherein the NK cell effector agent is selected from the group consisting of -1BBL, IL-2, IL-15, IL-21, MICA/B, ULBP2, ICAM-1, 2B4, BCM1/SLAMF2, CD155, CD112, Jagged1, Jagged2, Delta-like1 (Dll1), Delta-like 3 (Dll3), Delta-like 4(Dll4), Pref-1, DNER, Jedi, SOM-11, wingless, CCN3, MAGP2, MAGP1, TSP2, YB-1, EGFL7, CCR7, DAP12, and DAP10