WHAT IS CLAIMED IS:

1. A genetically engineered cell population that does not express major histocompatibility complex (MHC) I molecules,

wherein said engineered cell population is derived from ~~an immortalized cell~~ K562 cells,

wherein said engineered cell population is modified to express:

(a) membrane-bound interleukin-15 (mbIL15),

(b) ~~wherein said engineered cell population is modified to express~~ membrane-bound 4-1BB ligand (4-1BBL),

~~wherein said engineered cell population is modified to express at least one additional membrane bound interleukin that stimulates immune cell activation,~~

(c) ~~wherein the at least one additional~~ membrane bound interleukin ~~comprises~~ (IL) 12A (mbIL12A),

(d) ~~or a fragment thereof, or~~ membrane bound interleukin 12B (mbIL12B), ~~or a fragment thereof,~~ and

(e) ~~wherein the at least one additional~~ membrane bound interleukin ~~comprises~~ IL18 (mbIL18), ~~or fragment thereof, and~~ wherein the mbIL18 has at least ~~about~~ 95% sequence ~~homology~~ identity to the amino acid sequence of SEQ ID NO: 8,

wherein each of mbIL15, mbIL12A, mbIL12B, and mbIL18 comprises a transmembrane domain of human CD8α, and

wherein co-culture of said engineered cell population with a population of ~~immune~~ Natural Killer (NK) cells results in the enhanced activation and enhanced expansion of at least one subpopulation of immune cells~~.~~ as compared to NK cells co-cultured with K562 cells expressing 4-1BBL and mbIL15 but not expressing mbIL12A, mbIL12B, and mbIL18.

2. The engineered cell population of Claim 1, wherein the mbIL15 is encoded by a nucleic acid sequence that comprises SEQ ID NO. 1.

3. The engineered cell population of Claim 1 or Claim 2, wherein the 4-1BBL is encoded by a nucleic acid sequence that comprises SEQ ID NO. 13.

~~4. The engineered cell population according to any one of Claims 1 to 3, wherein each of the membrane bound molecules is coupled to a transmembrane domain of human CD8α.~~

~~5.~~4. The engineered cell population of Claim ~~4~~ 1, wherein the transmembrane domain of human CD8α comprises the sequence of SEQ ID NO. 18.

~~6. The engineered cell population according to any one of Claims 1 to 5, wherein the engineered cell population is derived from a cell line selected from the group consisting of K562 cells, Wilms tumor cell line HFWT, endometrial tumor cell line HHUA, melanoma cell line HMV-II, hepatoblastoma cell line HuH-6, lung small cell carcinoma cell lines Lu-130 or Lu-134-A, neuroblastoma cell lines NB19 or NB69, embryonal carcinoma testis cell line NEC14, cervical carcinoma cell line TCO-2, and neuroblastoma cell line TNB1.~~

~~7.~~5. The engineered cell population according to any one of Claims 1 to ~~6~~ 4, wherein the engineered cell population lacks expression of MHC II molecules.

~~8. The engineered cell population according to any one of Claims 1 to 7, wherein the engineered cell population is derived from K562 cells.~~

~~9.~~6. The engineered cell population according to any one of Claims 1 to ~~8~~ 5, wherein the IL12A comprises the sequence of SEQ ID NO. 4.

~~10.~~7. The engineered cell population according to any one of Claims 1 to ~~9~~ 6, wherein the IL12B comprises the sequence of SEQ ID NO. 6.

~~11. An engineered cell population according to any one of Claims 1 to 10, wherein the at least additional membrane bound interleukin comprises IL12A and IL12B, or fragments thereof.~~

~~12.~~8. An engineered cell population according to any one of Claims ~~1-11~~ 1 to 7, wherein the engineered cell population further expresses membrane bound IL21 (mbIL21)~~, or fragment thereof~~.

~~13.~~9. The engineered cell population of Claim ~~12~~ 8, wherein the IL21 comprises the sequence of SEQ ID NO. 10~~, or a fragment thereof~~.

~~14.~~10. The engineered cell population according to any one of Claims 1 to ~~13~~ 9, wherein the cells further express:

membrane bound IL22 (mbIL22), ~~or fragment thereof,~~ wherein the IL22 comprises the sequence of SEQ ID NO. 12, ~~or a fragment thereof,~~ and/or

a membrane bound anti-CD3 antibody (mbα-CD3), an antibody fragment thereof, or scFv, wherein the mbα-CD3 is optionally a monoclonal antibody, and, optionally, wherein the mbα-CD3 targets an epitope within the nucleic acid sequence of CD3 epsilon of SEQ ID NO. 15 .

~~15.~~11. The engineered cell population of Claim ~~14~~ 10, wherein the mbα-CD3 is a scFv, and ~~optionally~~ comprises a sequence having at least 95% ~~homology~~ identity to SEQ ID NO. 17.

~~16.~~12. A method for expanding ~~immune~~ NK cells, comprising co-culturing a blood sample comprising ~~immune~~ NK cells with the engineered cell population of any one of Claims 1 to ~~15~~ 11.

~~17. The method of Claim 16, wherein the immune cells are Natural Killer (NK) cells.~~

~~18. A genetically engineered cell population that does not express major histocompatibility complex (MHC) I molecules,~~

~~wherein said engineered cell population is derived from a cancerous cell,~~

~~wherein said engineered cell population is modified to express membrane-bound interleukin-15 (mbIL15),~~

~~wherein said engineered cell population is modified to express membrane-bound 4-1BB ligand (4-1BBL),~~

~~wherein said engineered cell population is modified to express at least one additional membrane bound interleukin that stimulates immune cell activation,~~

~~wherein the at least one additional membrane bound interleukin comprises IL12A, or a fragment thereof, or IL12B, or a fragment thereof, and~~

~~wherein the at least one additional membrane bound interleukin comprises IL18 (mbIL18), or fragment thereof, and wherein the mbIL18 has at least about 95% sequence homology to the amino acid sequence of SEQ ID NO: 8, and~~

~~wherein co-culture of said engineered cell population with a population of immune cells results in the activation and expansion of at least one subpopulation of immune cells.~~

~~19. The engineered cell population of Claim 18, wherein the IL12A comprises the sequence of SEQ ID NO. 4.~~

~~20. The engineered cell population of Claim 18 or 19, wherein the IL12B comprises the sequence of SEQ ID NO. 6.~~

~~21. The engineered cell population according to any one of Claims 18 to 20, wherein the interleukin comprises IL12A and IL12B, or fragments thereof.~~

~~22.~~13. An engineered cell population according to any one of Claims ~~18 to 21~~ 1 to 11, wherein the engineered cell population further expresses:

membrane bound IL21 (mbIL21), ~~or fragment thereof,~~ wherein the IL21 comprises the sequence of SEQ ID NO. 10, ~~or a fragment thereof,~~

membrane bound IL22 (mbIL22), ~~or fragment thereof,~~ wherein the IL22 comprises the sequence of SEQ ID NO. 12, ~~or a fragment thereof,~~

a membrane bound anti-CD3 antibody (mbα-CD3), an antibody fragment thereof, or scFv, wherein the mbα-CD3 is optionally a monoclonal antibody, and

~~optionally,~~ wherein the mbα-CD3 targets an epitope within the nucleic acid sequence of CD3 epsilon of SEQ ID NO. 15.

~~23.~~14. The engineered cell population according to ~~any one of Claims 18 to 22~~ Claim 13, wherein the mbα-CD3 is a scFv, and ~~optionally,~~ wherein the scFv comprises the sequence of SEQ ID NO. 17.

~~24. An engineered cell population according to any one of Claims 18 to 23, wherein the engineered cell population is derived from a cell line selected from the group consisting of K562 cells, Wilms tumor cell line HFWT, endometrial tumor cell line HHUA, melanoma cell line HMV II, hepatoblastoma cell line HuH 6, lung small cell carcinoma cell lines Lu 130 or Lu 134 A, neuroblastoma cell lines NB19 or NB69, embryonal carcinoma testis cell line NEC14, cervical carcinoma cell line TCO 2, and neuroblastoma cell line TNB1.~~

~~25.~~15. An engineered cell population according to any one of Claims ~~18 to 24~~ 1 to 11 or 13 to 14, wherein the engineered cells lack expression of MHC II molecules.

~~26. The engineered cell population of Claim 25, wherein the engineered cells are derived from K562 cells.~~

~~27. An engineered cell population according to any one of Claims 18 to 26, wherein each of the membrane bound molecules is coupled to a transmembrane domain of human CD8α.~~

~~28. The engineered cell population of Claim 27, wherein the transmembrane domain of human CD8α comprises the sequence of SEQ ID NO. 18.~~

~~29. An engineered cell population according to any one of Claims 18 to 28 wherein the mbIL15 is encoded by a nucleic acid sequence that comprises SEQ ID NO. 1.~~

~~30. An engineered cell population according to any one of Claims 18 to 29, wherein the mb4 1BBL is encoded by a nucleic acid sequence that comprises SEQ ID NO. 13.~~

~~31.~~16. A genetically engineered cell population that does not express major histocompatibility complex (MHC) I molecules,

wherein said engineered cell population is derived from ~~a cancerous cell~~ K562 cells,

wherein said engineered cell population is modified to express:

(a) membrane-bound interleukin-15 (mbIL15),

(b) ~~wherein said engineered cell population is modified to~~ membrane-bound express 4-1BB ligand (4-1BBL),

(c) membrane bound interleukin (IL) 12A (mbIL12A),

(d) membrane bound interleukin (IL) 12B (mbIL12B),

(e) membrane bound interleukin IL18 (mbIL18), and

(f) ~~wherein said engineered cell population is modified to express~~ a membrane-bound anti-CD3 antibody (mbα-CD3) that stimulates immune cell activation, wherein the mbα-CD3 is an scFv and wherein the scFv comprises the sequence of SEQ ID NO. 17, and

wherein co-culture of said engineered cell population with a population of immune cells results in the activation and expansion of at least one subpopulation of immune cells.

~~32. The engineered cell population of Claim 31, wherein the mbα-CD3 is a monoclonal antibody.~~

~~33.~~17. An engineered cell population according to Claim ~~31 or 32~~ 16, wherein the mbα-CD3 targets an epitope within the nucleic acid sequence of CD3 epsilon of SEQ ID NO. 15.

~~34.~~18. An engineered cell population according to ~~any one of Claims 31 to 33~~ Claim 16 or 17, wherein: ~~the cells further express at least one membrane bound interleukin, or fragment thereof,~~

~~wherein at least one membrane bound interleukin comprises IL12A, or a fragment thereof, and optionally wherein~~ the mbIL12A comprises the sequence of SEQ ID NO. 4,

~~wherein at least one membrane bound interleukin comprises IL12B, or a fragment thereof, and optionally wherein~~ the mbIL12B comprises the sequence of SEQ ID NO. 6, and

~~wherein at least one membrane bound interleukin comprises IL18, or a fragment thereof, and optionally wherein~~ the mbIL18 comprises the sequence of SEQ ID NO. 8~~,~~.

~~wherein at least one membrane-bound interleukin comprises IL21, or a fragment thereof, and optionally wherein the IL21 comprises the sequence of SEQ ID NO. 10, and/or~~

~~wherein at least one membrane-bound interleukin comprises IL22, or a fragment thereof, and optionally wherein the IL22 comprises the sequence of SEQ ID NO. 12.~~

~~35.~~19. An engineered cell population according to any one of Claims ~~18 to 34~~ 1 to 7, wherein the engineered cells ~~are suitable for the expansion of immune cells.~~ further express one or both of membrane-bound IL21 (mbIL21) and/or membrane-bound IL22, wherein the mbIL21 comprises the IL21 sequence of SEQ ID NO. 10, and wherein the mbIL22 comprises the IL22 sequence of SEQ ID NO. 12.

~~36. The engineered cell population of Claim 35, wherein the expanded immune cells are NK cells.~~

~~37.~~20. A method for expanding NK cells, comprising co-culturing a sample comprising NK cells with the engineered cell population of any one of Claims ~~25 to 69 18 to 35~~ 1 to 11 or 13 to 19.

~~38.~~21. A method for preparing the engineered cell population of any one of Claims 1 to ~~35~~ 11 or 13 to 19, comprising:

transducing the cells with a first construct encoding mbIL15, thereby generating a first transduced population of cells,

expanding the first transduced population of cells,

transducing the first transduced population of cells with a second construct encoding 4-1BBL, thereby generating a second transduced population of cells,

transducing the second transduced population of cells with a third construct encoding ~~at least one additional molecule capable of stimulating immune cells~~ membrane bound interleukin (IL) 12A (mbIL12A), thereby generating a third transduced population of cells, ~~and~~

transducing the third transduced population of cells with a fourth construct encoding membrane bound interleukin (IL) 12B (mbIL12B), thereby generating a fourth transduced population of cells,

transducing the fourth transduced population of cells with a fifth construct encoding membrane bound interleukin (IL) 18 (mbIL18), thereby generating a fifth transduced population of cells, and

expanding the ~~third~~ fifth transduced population of cells.

~~39.~~22. A plurality of nucleic acids, for use in preparing the engineered cell population of any one of Claims 1 to ~~35~~ 11 or 13 to 19, comprising ~~at least 3 4 of~~:

a nucleic acid encoding mbIL15,

a nucleic acid encoding 4-1BBL,

a nucleic acid encoding mbIL12A,

a nucleic acid encoding mbIL12B, and

a nucleic acid encoding mbIL18.~~, and,~~

~~optionally, one or more of:~~

~~a nucleic acid encoding mbIL21,~~

~~a nucleic acid encoding mbIL22, and~~

~~a nucleic acid encoding mbα-CD3.~~

~~40.~~23. The plurality of nucleic acids of Claim ~~39~~ 22, wherein the plurality of nucleic acids are configured as a single construct.

~~41.~~24. The plurality of nucleic acids of Claim ~~39~~ 22, wherein mbIL15 is encoded by a nucleic acid sequence comprising SEQ ID NO. 1, wherein 4-1BBL is encoded by a nucleic acid sequence comprising SEQ ID NO. 13, wherein mbIL12A is encoded by a nucleic acid sequence comprising SEQ ID NO. 3, wherein mbIL12B is encoded by a nucleic acid sequence comprising SEQ ID NO. 5, and wherein mbIL18 is encoded by a nucleic acid sequence comprising SEQ ID NO. 7.~~, wherein mbIL21 is encoded by a nucleic acid sequence comprising SEQ ID NO. 9, or a fragment thereof, wherein mbIL22 is encoded by a nucleic acid sequence comprising SEQ ID NO. 11, or a fragment thereof, and/or wherein mbα CD3 is encoded by a nucleic acid sequence comprising SEQ ID NO. 16.~~

~~42.~~25. The plurality of nucleic acids according to any one of Claims ~~39 to 41~~ 22 to 24, wherein each of the plurality of nucleic further comprises a GFP tag.

~~43.~~26. A method for expanding NK cells, comprising:

a) obtaining a peripheral blood sample comprising a mixed population of immune cells comprising NK cells and T cells,

b) contacting mixed population of cells with an engineered cell population that exhibits reduced expression of MHC I and has been modified to express:

i) membrane-bound interleukin-15 (mbIL15),

ii) 4-1BB ligand (4-1BBL), ~~and~~

iii) ~~at least one additional molecule that stimulates immune cell activation,~~

~~wherein the at least one additional~~ membrane bound interleukin ~~comprises~~ IL12A,

iv) ~~or a fragment thereof, or~~ membrane bound interleukin IL12B, ~~or a fragment thereof,~~ and

v) ~~wherein the at least one additional~~ membrane bound interleukin ~~comprises~~ IL18 (mbIL18), ~~or fragment thereof,~~ and wherein the mbIL18 has at least ~~about~~ 95% sequence ~~homology~~ identity to the amino acid sequence of SEQ ID NO: 8, and

c) co-culturing the mixed population of cells with the engineered cells for a period of time sufficient to expand the NK cells of the mixed population of immune cells, thereby expanding the NK cells.

~~44.~~27. The method of Claim ~~43~~ 26, ~~optionally~~ further comprising removing T cells from the mixed population either prior to or after co-culturing.

~~45. Use of the engineered cell population according to any one of Claims 1 to 35, for use in the expansion of a population of immune cells, wherein the population of immune cells is suitable for use in the treatment of cancer or infectious disease, and wherein the population of immune cells comprises NK cells.~~

~~46.~~28. A composition comprising an expanded subpopulation of ~~immune~~Natural Killer (NK) cells,

wherein said ~~immune~~ NK cells have been expanded by co-culturing the ~~immune~~ NK cells with an engineered cell population,

wherein said engineered cell population is derived from ~~a cancerous cell~~ K562 cells,

wherein said engineered cell population is modified to express:

(a) membrane-bound interleukin-15 (mbIL15),

(b) ~~wherein said engineered cell population is modified to express~~ membrane-bound 4-1BB ligand (4-1BBL),

~~wherein said engineered cell population is modified to express at least one additional membrane bound interleukin that stimulates immune cell activation,~~

(c) ~~wherein the at least one additional~~ membrane bound ~~interleukin comprises~~ IL12A,

(d) ~~or a fragment thereof, or~~ membrane bound IL12B, ~~or a fragment thereof,~~ and

(e) ~~wherein the at least one additional~~ membrane bound ~~interleukin comprises~~ IL18 (mbIL18), ~~or fragment thereof,~~ and wherein the mbIL18 has at least ~~about~~ 95% sequence ~~homology~~ identity to the amino acid sequence of SEQ ID NO: 8,

wherein co-culture of said engineered cell population with a population of ~~immune~~ NK cells results in the activation and expansion of ~~at least one subpopulation of immune~~ NK cells, and

wherein the composition comprising said ~~at least one subpopulation of immune~~ NK cells is for use in treating cancer or an infectious disease.

~~47. The composition for use of Claim 46, wherein the subpopulation of cells comprises NK cells.~~