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,

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 said engineered cell population does not express major histocompatibility complex (MHC) I molecules, 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.

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, wherein the 4-1BBL is encoded by a nucleic acid sequence that comprises SEQ ID NO. 13.

4. The engineered cell population of Claim 1, wherein each of the membrane bound molecules is coupled to a transmembrane domain of human CD8α.

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

6. The engineered cell population of Claim 1, 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. The engineered cell population of Claim 1, wherein the engineered cell population lacks expression of MHC II molecules.

8. The engineered cell population of Claim 1, wherein the engineered cell population is derived from K562 cells.

9. An engineered cell population according to any one of Claims 1-8, wherein the interleukin comprises IL12A, or a fragment thereof.

10. The engineered cell population of Claim 9, wherein the IL12A comprises the sequence of SEQ ID NO. 4.

11. An engineered cell population according to any one of Claims 1-8, wherein the interleukin comprises IL12B, or a fragment thereof.

12. The engineered cell population of Claim 11, wherein the IL12B comprises the sequence of SEQ ID NO. 6.

13. An engineered cell population according to any one of Claims 1-8, wherein the interleukin comprises IL12A and IL12B, or fragments thereof.

14. An engineered cell population according to any one of Claims 1-8, wherein the engineered cell population further expresses membrane bound IL18 (mbIL18), or fragment thereof.

15. The engineered cell population of Claim 14, wherein the IL18 comprises the sequence of SEQ ID NO. 8.

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

17. The engineered cell population of Claim 16, wherein the IL21 comprises the sequence of SEQ ID NO. 10, or a fragment thereof.

18. The engineered cell population of Claim 1, wherein the cells express membrane bound IL22 (mbIL22), or fragment thereof.

19. The engineered cell population of Claim 18, wherein the IL22 comprises the sequence of SEQ ID NO. 12, or a fragment thereof.

20. An engineered cell population according to any one of Claims 1-8, wherein the cells further comprise a membrane bound anti-CD3 antibody (mbα-CD3), an antibody fragment thereof, or scFv.

21. The engineered cell population of Claim 20, wherein the mbα-CD3 is a monoclonal antibody.

22. The engineered cell population of Claim 21, wherein the mbα-CD3 targets an epitope within the nucleic acid sequence of CD3 epsilon of SEQ ID NO. 15.

23. The engineered cell population of Claim 20, wherein the mbα-CD3 is a scFv.

24. The engineered cell population of Claim 23, wherein the scFv comprises the sequence of SEQ ID NO. 17.

25. A method for expanding immune cells, comprising co-culturing a blood sample comprising immune cells with the engineered cell population of any one of Claims 1 to 24.

26. The method of Claim 25, wherein the immune cells are Natural Killer (NK) cells.

27. 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, 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.

28. The engineered cell population of Claim 27, wherein the interleukin comprises IL12A, or a fragment thereof.

29. The engineered cell population of Claim 28, wherein the IL12A comprises the sequence of SEQ ID NO. 4.

30. The engineered cell population of Claim 28, wherein the interleukin comprises IL12B, or a fragment thereof.

31. The engineered cell population of Claim 30, wherein the IL12B comprises the sequence of SEQ ID NO. 6.

32. The engineered cell population of Claim 27, wherein the interleukin comprises IL12A and IL12B, or fragments thereof.

33. An engineered cell population according to any one of Claims 27-32, wherein the engineered cell population further expresses membrane bound IL18 (mbIL18), or fragment thereof.

34. The engineered cell population of Claim 33, wherein the IL18 comprises the sequence of SEQ ID NO. 8.

35. An engineered cell population according to any one of Claims 27-34, wherein the engineered cell population expresses membrane bound IL21 (mbIL21), or fragment thereof.

36. The engineered cell population of Claim 35, wherein the IL21 comprises the sequence of SEQ ID NO. 10, or a fragment thereof.

37. An engineered cell population according to any one of Claims 27-36, wherein the engineered cell population expresses membrane bound IL22 (mbIL22), or fragment thereof.

38. The engineered cell population of Claim 37, wherein the IL22 comprises the sequence of SEQ ID NO. 12, or a fragment thereof.

39. An engineered cell population according to any one of Claims 27-38, wherein the engineered cell population further comprises a membrane bound anti-CD3 antibody (mbα-CD3), an antibody fragment thereof, or scFv.

40. The engineered cell population of Claim 39, wherein the mbα-CD3 is a monoclonal antibody.

41. An engineered cell population according to Claim 39 or 40, wherein the mbα-CD3 targets an epitope within the nucleic acid sequence of CD3 epsilon of SEQ ID NO. 15.

42. The engineered cell population of Claim 39, wherein the mbα-CD3 is a scFv.

43. The engineered cell population of Claim 42, wherein the scFv comprises the sequence of SEQ ID NO. 17.

44. An engineered cell population according to any one of Claims 27-43, 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.

45. An engineered cell population according to any one of Claims 27-44, wherein the engineered cells lack expression of MHC II molecules.

46. The engineered cell population of Claim 45, wherein the engineered cells are derived from K562 cells.

47. An engineered cell population according to any one of Claims 27-46, wherein each of the membrane bound molecules is coupled to a transmembrane domain of human CD8α.

48. The engineered cell population of Claim 47, wherein the transmembrane domain of human CD8α comprises the sequence of SEQ ID NO. 18.

49. An engineered cell population according to any one of Claims 27-48, wherein the mbIL15 is encoded by a nucleic acid sequence that comprises SEQ ID NO. 1.

50. An engineered cell population according to any one of Claims 27-49, wherein the mb4-1BBL is encoded by a nucleic acid sequence that comprises SEQ ID NO. 13.

51. 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 membrane-bound express 4-1BB ligand (4-1BBL),

wherein said engineered cell population is modified to express a membrane-bound anti-CD3 antibody (mbα-CD3) that stimulates immune cell activation, 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.

52. The engineered cell population of Claim 51, wherein the mbα-CD3 is a monoclonal antibody.

53. An engineered cell population according to Claim 51 or 52, wherein the mbα-CD3 targets an epitope within the nucleic acid sequence of CD3 epsilon of SEQ ID NO. 15.

54. The engineered cell population of Claim 51, wherein the mbα-CD3 is a scFv.

55. The engineered cell population of Claim 54, wherein the scFv comprises the sequence of SEQ ID NO. 17.

56. An engineered cell population according to any one of Claims 51 to 55, wherein the cells further express at least one membrane-bound interleukin, or fragment thereof.

57. The engineered cell population of Claim 56, wherein the interleukin comprises IL12A, or a fragment thereof.

58. The engineered cell population of Claim 57, wherein the IL12A comprises the sequence of SEQ ID NO. 4.

59. An engineered cell population according to any one of Claims 56-58, wherein the at least one membrane-bound interleukin, or fragment thereof comprises IL12B, or a fragment thereof.

60. The engineered cell population of Claim 59, wherein the IL12B at least one membrane-bound interleukin, or fragment thereof the sequence of SEQ ID NO. 6.

61. An engineered cell population according to any one of Claims 56-60, wherein the at least one membrane-bound interleukin, or fragment thereof comprises IL12A and IL12B, or fragments thereof.

62. An engineered cell population according to any one of Claims 56-67, wherein the cells further express membrane bound IL18 (mbIL18), or a fragment thereof.

63. The engineered cell population of Claim 62, wherein the IL18 comprises the sequence of SEQ ID NO. 8.

64. An engineered cell population according to any one of Claims 56-63, wherein the cells express membrane bound IL21 (mbIL21), or a fragment thereof.

65. The engineered cell population of Claim 64, wherein the IL21 comprises the sequence of SEQ ID NO. 10, or a fragment thereof.

66. An engineered cell population according to any one of Claims 56-65, wherein the cells express membrane bound IL22 (mbIL22), or fragment thereof.

67. The engineered cell population of Claim 66, wherein the IL22 comprises the sequence of SEQ ID NO. 12, or a fragment thereof.

68. An engineered cell population according to any one of Claims 25-67, wherein the engineered cells are suitable for the expansion of immune cells.

69. The engineered cell population of Claim 68, wherein the expanded immune cells are NK cells.

70. 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.

71. A method for preparing the engineered cell population of any one of Claims 25 to 69, 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, thereby generating a third transduced population of cells, and

expanding the third transduced population of cells.

72. A plurality of nucleic acids, for use in preparing the engineered cell population of any one of Claims 25 to 69, comprising at least 3 of:

a nucleic acid encoding mbIL15,
a nucleic acid encoding 4-1BBL,
a nucleic acid encoding mbIL12A,
a nucleic acid encoding mbIL12B,
a nucleic acid encoding mbIL18,
a nucleic acid encoding mbIL21,
a nucleic acid encoding mbIL22, and
a nucleic acid encoding mbα-CD3.

73. The plurality of nucleic acids of Claim 72, wherein the plurality of nucleic acids are configured as a single construct.

74. The plurality of nucleic acids of Claim 72, wherein mbIL15 is encoded by a nucleic acid sequence comprising SEQ ID NO. 1.

75. The plurality of nucleic acids of Claim 72, wherein 4-1BBL is encoded by a nucleic acid sequence comprising SEQ ID NO. 13.

76. The plurality of nucleic acids of Claim 72, wherein mbIL12A is encoded by a nucleic acid sequence comprising SEQ ID NO. 3.

77. The plurality of nucleic acids of Claim 72, wherein mbIL12B is encoded by a nucleic acid sequence comprising SEQ ID NO. 5.

78. The plurality of nucleic acids of Claim 72, wherein mbIL18 is encoded by a nucleic acid sequence comprising SEQ ID NO. 7.

79. The plurality of nucleic acids of Claim 72, wherein mbIL21 is encoded by a nucleic acid sequence comprising SEQ ID NO. 9, or a fragment thereof.

80. The plurality of nucleic acids of Claim 72, wherein mbIL22 is encoded by a nucleic acid sequence comprising SEQ ID NO. 11, or a fragment thereof

81. The plurality of nucleic acids of Claim 72, wherein mbα-CD3 is encoded by a nucleic acid sequence comprising SEQ ID NO. 16.

82. The plurality of nucleic acids of Claim 72, wherein each of the plurality of nucleic further comprises a GFP tag.

83. 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, 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.

84. The method of Claim 83, optionally further comprising removing T cells from the mixed population either prior to or after co-culturing.

85. A modified cell line comprising K562 myeloid leukemia cells that lack major histocompatibility complex I molecules wherein said K562 myeloid leukemia cells are genetically modified to express membrane-bound interleukin-15, 4-1BB ligand, and membrane-bound anti-CD3 antibody.

86. A modified cell line comprising K562 myeloid leukemia cells that lack major histocompatibility complex I molecules wherein said K562 myeloid leukemia cells are genetically modified to express membrane-bound interleukin-15, membrane-bound 4-1BB ligand, and at least one additional membrane-bound interleukin.

87. The modified cell line of Claim 86, wherein the additional membrane-bound interleukin expressed is interleukin-12.

88. The modified cell line of Claim 86, wherein the additional membrane-bound interleukin expressed is interleukin-18.

89. The modified cell line of Claim 86, wherein the additional membrane-bound interleukins expressed are interleukin-12 and interleukin-18.

90. A modified cell line according to any one of Claims 86-89, further comprising a membrane-bound anti-CD3 antibody.

91. A modified cell line according to any one of Claims 86-90, further comprising one or more of mbIL12A, mbIL12B, mbIL18, mbIL21, mbIL22, and mbα-CD3.

92. A modified cell line comprising K562 myeloid leukemia cells that lack major histocompatibility complex I molecules wherein said K562 myeloid leukemia cells are genetically modified to express membrane-bound interleukin-15, membrane-bound 4-1BB ligand, membrane-bound anti-CD3 antibody, and at least one additional membrane-bound interleukin.

93. The modified cell line of Claim 92, wherein the additional membrane-bound interleukin expressed is interleukin-12.

94. The modified cell line of claim 92, wherein the additional membrane-bound interleukin expressed is interleukin-18.

95. The modified cell line of claim 92, wherein the additional membrane-bound interleukins expressed are interleukin-12 and interleukin-18.

96. The modified cell line of Claim 92, wherein the at least one additional interleukin comprises one or more of mbIL12A, mbIL12B, mbIL18, mbIL21, and mbIL22.

97. A population of NK cells expanded by culturing a mixed cell culture comprising NK cells and T lymphocytes with the modified cell line of any one Claims 85-86.

98. Use of the population of NK cells of Claim 97, for the treatment of cancer or infectious disease.

99. Use of the engineered cell population according to any one of Claims 25-69, 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.

100. A composition comprising an expanded subpopulation of immune cells,

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

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 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, and

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

101. The composition of Claim 100, wherein the administered subpopulation of cells comprises NK cells.

102. A composition comprising an expanded subpopulation of immune cells,

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

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 an anti CD-3 antibody,

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, and

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