example, in one embodiment the present invention provides a method for maintaining or expanding a population of cells of interest comprising obtaining conditioned medium from a culture of a population of E4ORF1+ ETS+ engineered endothelial cells (such as, preferably, E4ORF1+ ETV2+ engineered endothelial cells), and contacting the cells of interest with the conditioned medium. Similarly, in one embodiment the present invention provides a method for maintaining or expanding a population of cells of interest comprising: obtaining or generating a population of E4ORF1+ ETS+ engineered endothelial cells (such as, preferably, E4ORF1+ ETV2+ engineered endothelial cells), culturing the engineered endothelial cells in a culture vessel, collecting conditioned medium from the culture vessel, and contacting the cells of interest with the conditioned medium. Each of such methods may also include subsequently culturing the cells of interest.

[00013] Similarly, in some embodiments the present invention provides conditioned cell culture medium obtained from a culture of engineered endothelial cells of the invention. For example, in one embodiment the present invention provides a conditioned cell culture medium obtained from a culture of E4ORF1+ ETS+ engineered endothelial cells (such as, preferably, E4ORF1+ ETV2+ engineered endothelial cells).

[00014] In some embodiments the present invention also provides nucleic acid vector molecules. For example, in one embodiment the present invention provides a nucleic acid vector comprising both a nucleotide sequence encoding an ETS transcription factor polypeptide and a nucleotide sequence encoding an E4ORF1 polypeptide. In preferred embodiments the present invention provides a nucleic acid vector comprising both a nucleotide sequence encoding an ETV2 polypeptide and a nucleotide sequence encoding an E4ORF1 polypeptide. In some such embodiments the vector is an expression vector. In some such embodiments the vector is a lentiviral vector. In some such embodiments the vector is a retroviral vector. In some such embodiments the two nucleotide sequences are under the control of separate promoters. In other embodiments both nucleotide sequences are under the control of the same promoter.

[00014a] In some embodiments the present invention also provides a method of maintaining or expanding endothelial cells in culture, the method comprising: introducing a nucleic acid molecule encoding an ETV2 polypeptide and a nucleic acid molecule encoding an E4ORF1 polypeptide into endothelial cells to produce E4ORF1+ ETV2+ engineered endothelial cells, and culturing the engineered endothelial cells in vitro, thereby maintaining or expanding the endothelial cells in culture.

[00014b] In some embodiments the present invention also provides a method of maintaining or expanding a population of cells of interest in culture, the method comprising: (a) obtaining or generating a population of E4ORF1+ ETV2+ engineered endothelial cells according to claims 1, and (b) culturing the engineered endothelial cells in the same culture vessel with a population of cells of interest, wherein the cells of interest are cancer cells, stem cells, progenitor cells or hybridoma cells.

[00014c] In some embodiments the present invention also provides a method maintaining or expanding a population of cells of interest, the method comprising (a) obtaining or generating a population of E4ORF1+ ETV2+ engineered endothelial cells according to claim 1, (b) culturing the engineered endothelial cells in a culture vessel, (c) collecting conditioned medium from the culture vessel, and (d) contacting the cells of interest with the conditioned medium, wherein the cells of interest are cancer cells, stem cells, progenitor cells or hybridoma cells.

[00014d] In some embodiments the present invention also provides a population of engineered endothelial cells as disclosed herein or a composition comprising a population of engineered endothelial cells as disclosed herein, wherein the population of engineered endothelial cells is an isolated population.

[00014e] In some embodiments the present invention also provides a population of engineered endothelial cells as disclosed herein or a composition comprising a population of engineered endothelial cells as disclosed herein, wherein the population of engineered endothelial cells is a substantially pure population.

[00014f] In some embodiments the present invention also provides a population of engineered endothelial cells as disclosed herein or a composition comprising a population of engineered endothelial cells as disclosed herein, wherein the population of engineered endothelial cells comprises a nucleic acid sequence that encodes an adenovirus E4ORF1 polypeptide but that does not comprise the entire adenovirus E4 region.

[00015] The cell populations, compositions, and methods described herein may be useful in a variety of applications (as described further on other sections of this patent disclosure). In general, the engineered endothelial cells provided herein, and the related compositions and methods, can be used for any application in which other endothelial cells (e.g. naïve

## CLAIMS

1. A population of E4ORF1+ ETV2+ engineered endothelial cells.

2. The population of engineered endothelial cells of claim 1, wherein the cells comprise a recombinant nucleic acid molecule that encodes an ETV2 polypeptide.

3. The population of engineered endothelial cells of claim 1, wherein the cells comprise a recombinant nucleic acid molecule that encodes an adenovirus E4ORF1 polypeptide.

4. The population of claim 2 or 3, wherein the nucleic acid molecule is in the form of a plasmid vector.

5. The population of claim 2 or 3, wherein the nucleic acid molecule is not integrated into the genomic DNA of the engineered endothelial cells.

6. The population of claim 2 or 3, wherein the nucleic acid molecule is integrated into the genomic DNA of the engineered endothelial cells.

7. The population of any claim 1, wherein the endothelial cells are derived from differentiated endothelial cells.

8. The population of claim 1, wherein the endothelial cells are derived from adult endothelial cells.

9. The population of claim 1, wherein the endothelial cells are not embryonic endothelial cells.

10. The population of engineered endothelial cells of claim 1, wherein the endothelial cells are human endothelial cells.

11. The population of engineered endothelial cells of claim 1, wherein the endothelial cells are derived from primary endothelial cells.

12. The population of engineered endothelial cells of claim 1, wherein the endothelial cells are derived from human umbilical vein endothelial cells (HUVECs).

13. A composition comprising a population of engineered endothelial cells according to claim 1.

14. The composition of claim 13, further comprising a carrier solution.

15. The composition of claim 14, wherein the carrier solution is a physiological saline solution.

16. The composition of claim 13, wherein the composition further comprises stem or progenitor cells.

17. The composition of claim 16, wherein the stem or progenitor cells are hematopoietic stem or progenitor cells (HSPCs).

18. A therapeutic composition comprising a population of engineered endothelial cells according to claim 1 and a carrier solution suitable for administration to a subject.

19. The therapeutic composition of claim 18, wherein the carrier solution is a physiological saline solution.

20. The therapeutic composition of claim 18, wherein the composition further comprises stem or progenitor cells.

21. The therapeutic composition of claim 20, wherein the stem or progenitor cells are HSPCs.

22. The composition of claim 17 or the therapeutic composition of claim 21, wherein the HSPCs are obtained or derived from bone marrow.

23. The composition of claim 17 or the therapeutic composition of claim 21, wherein the HSPCs are obtained or derived from peripheral blood.

24. The composition of claim 17 or the therapeutic composition of claim 21, wherein the HSPCs are obtained or derived from amniotic fluid.

25. The composition of claim 17 or the therapeutic composition of claim 21, wherein the HSPCs are obtained from umbilical cord blood.

26. A method of maintaining or expanding endothelial cells in culture, the method comprising: introducing a nucleic acid molecule encoding an ETV2 polypeptide and a nucleic acid molecule encoding an E4ORF1 polypeptide into endothelial cells to produce E4ORF1+ ETV2+ engineered endothelial cells, and culturing the engineered endothelial cells in vitro, thereby maintaining or expanding the endothelial cells in culture.

27. The method of claim 26, further comprising culturing the engineered endothelial cells.

28. The method of claim 26, further comprising culturing the engineered endothelial cells in the absence of serum.

29. The method of claim 26, further comprising culturing the engineered endothelial cells in the absence of exogenous growth factors.

30. The method of claim 26, wherein the introducing is performed by transfection.

31. The method of claim 30, wherein the transfection is performed using a method selected from the group consisting of liposome-mediated transfection, polybrene-mediated transfection, DEAE dextran-mediated transfection, electroporation, calcium phosphate precipitation, microinjection, and micro-particle bombardment.

32. The method of claim 26, wherein the introducing is performed by viral-mediated transduction.

33. The method of claim 27, wherein the viral-mediated transduction is performed using a method selected from the group consisting of lentivirus-mediated transduction, adenovirus-mediated transduction, retrovirus-mediated transduction, adeno-associated virus-mediated transduction and herpesvirus-mediated transduction.

34. The method of claim 26, wherein the endothelial cells are primary endothelial cells.

35. The method of claim 26, wherein the endothelial cells are human endothelial cells.

36. The method of claim 26, wherein the endothelial cells are human umbilical vein endothelial cells (HUVECs).

37. A method of maintaining or expanding a population of cells of interest in culture, the method comprising: (a) obtaining or generating a population of E4ORF1+ ETV2+ engineered endothelial cells according to claims 1, and (b) culturing the engineered endothelial cells in the same culture vessel with a population of cells of interest, wherein the cells of interest are cancer cells, stem cells, progenitor cells or hybridoma cells.

38. The method of claim 37, wherein the engineered endothelial cells form a feeder cell layer on the surface of the culture vessel.

39. The method of claim 37 wherein the cells of interest are HSPCs.

40. The method of claim 37 wherein the cells of interest are HSPCs and wherein the culturing results in a selective expansion of CD45RA- HSPCs.

41. The method of claim 37 wherein the cells of interest are HSPCs and wherein the culturing results in a selective expansion of CD34+high, CD45RA- HSPCs.

42. The method of claim 37 wherein the cells of interest are HSPCs and wherein the culturing results in an increase in the proportion of the HSPCs that are CD45RA-.

43. The method of claim 37 wherein the cells of interest are HSPCs and wherein the culturing results in an increase in the proportion of the HSPCs that are CD34+high, CD45RA-.

44. The method of claim 37 wherein the culturing of step (b) is performed in the absence of serum.

45. The method of claim 37 wherein the culturing of step (b) is performed in the absence of exogenous growth factors.

46. A method maintaining or expanding a population of cells of interest, the method comprising (a) obtaining or generating a population of E4ORF1+ ETV2+ engineered endothelial cells according to claim 1, (b) culturing the engineered endothelial cells in a culture vessel, (c) collecting conditioned medium from the culture vessel, and (d) contacting the cells of interest with the conditioned medium, wherein the cells of interest are cancer cells, stem cells, progenitor cells or hybridoma cells.

47. The method of claim 46, further comprising culturing the cells of interest.

48. A population of engineered endothelial cells according to any of claims 1-12 or a composition comprising a population of engineered endothelial cells according to any of claims 13-25, wherein the population of engineered endothelial cells is an isolated population.

49. A population of engineered endothelial cells according to any of claims 1-12 or a composition comprising a population of engineered endothelial cells according to any of

claims 13-25, wherein the population of engineered endothelial cells is a substantially pure population.

50. The population or composition of claim 49, wherein about 75-80% of the cells in the population are E4ORF1+ ETV2+ endothelial cells.

51. The population or composition of claim 49, wherein about 85-90% of the cells in the population are E4ORF1+ ETV2+ endothelial cells.

52. The population or composition of claim 49, wherein at least about 95% of the cells in the population are E4ORF1+ ETV2+ endothelial cells.

53. A population of engineered endothelial cells according to any of claims 1-12 or a composition comprising a population of engineered endothelial cells according to any of claims 13-25, wherein the population of engineered endothelial cells comprises a nucleic acid sequence that encodes an adenovirus E4ORF1 polypeptide but that does not comprise the entire adenovirus E4 region.

54. The population or composition of claim 53, wherein the nucleic acid sequence that encodes the adenovirus E4ORF1 polypeptide is operably linked to a CMV, SV40, RSV, HIVLtr, or MML promoter or an inducible promoter.

55. The population or composition of claim 53, wherein the nucleic acid sequence that encodes the adenovirus E4ORF1 polypeptide is in a lentiviral vector, a retroviral vector, an adeno-associated virus vector or a herpesvirus vector.