In another embodiment the therapeutic cell population is administered to a subject prior to administration of the support cell population.

In another embodiment the therapeutic cell population is administered to a subject contemporaneously with or simultaneously to administration of the support cell population.

In another aspect, the present invention provides a kit comprising the therapeutic and support cell populations of the invention.

~~In another aspect, the present invention provides~~Also disclosed is a method of treatment comprising administering the therapeutic cell population of the invention to a subject in need thereof.

~~In another aspect, the present invention provides~~Also disclosed is a method of treatment comprising administering the therapeutic cell population of the invention and the support cell population of the invention to a subject in need thereof.

Preferably, the treatment is a treatment by gene therapy.

In another aspect, the present invention provides a haematopoietic progenitor cell population for use in gene therapy, wherein the haematopoietic progenitor cell population has been transduced with a nucleotide of interest.

The step of transduction with a nucleotide of interest may, for example, utilise any of the methods of cell transduction described herein.

In another aspect, the present invention provides a haematopoietic progenitor cell population for use in gene therapy, wherein said cells have been separated from a population of cells comprising haematopoietic stem and progenitor cells and then transduced with a nucleotide of interest.

In one embodiment the haematopoietic progenitor cell population has the $CD34^{+}CD38^{int}$ phenotype. In another embodiment, the haematopoietic progenitor cell population has a $CD34^{+}CD38^{int1}$, $CD34^{+}CD38^{int2}$ and/or $CD34^{+}CD38^{+}$ phenotype. Thus the haematopoietic progenitor cell population may, for example, not comprise cells of the $CD34^{+}CD38^{-}$ phenotype.

In another embodiment the transduced progenitor cell population is administered in combination with a population of haematopoietic stem cells, for example a population of cells with the $CD34^{+}CD38^{-}$ phenotype.

~~In another aspect, the present invention provides~~Also disclosed is a method of gene therapy comprising administering a haematopoietic progenitor cell population to a subject in need thereof, wherein the haematopoietic progenitor cell population has been transduced with a nucleotide of interest.

In another aspect, the present invention provides a method of controlling the duration of transgene expression in a patient, wherein the duration of transgene expression is controlled by selectively administering transduced haematopoietic stem and/or progenitor cells based on CD38 expression level. Increased transgene expression duration may be achieved by administering cells with decreased levels of CD38 expression.

In another aspect, the present invention provides the use of prostaglandin E2 or a prostaglandin E2 derivative for increasing gene transfer efficiency when transducing haematopoietic stem or progenitor cells with a vector, preferably a viral vector.

In one embodiment the prostaglandin E2 derivative is 16,16-dimethyl prostaglandin E2.

Prostaglandin E2 or a prostaglandin E2 derivative (e.g. 16,16-dimethyl prostaglandin E2 (dmPGE2)) may be added to the population of cells during the pre-stimulation phase. In one embodiment the prostaglandin E2 or the prostaglandin E2 derivative is added at the start of the pre-stimulation phase. In another embodiment the prostaglandin E2 or the prostaglandin E2 derivative is added during the pre-stimulation phase.

For example, prostaglandin E2 or the prostaglandin E2 derivative may be added about 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 or 12 h before the exposure of the population of cells to the vector. Preferably, the prostaglandin E2 or the prostaglandin E2 derivative is added to the population of cells during the pre-stimulation phase, about 2 h before the exposure of the cells to the vector.

In another embodiment the prostaglandin E2 or the prostaglandin E2 derivative is added to the population of cells at the same time as exposure to the vector.

In another aspect, the present invention provides a method of transducing a population of cells with a vector, preferably a lentiviral vector, wherein the step of transducing a population of cells with a vector comprises culturing the cells for about 44 h or more. The "step of transducing a population of cells with a vector" is to be understood as the pre-stimulation and vector exposure phases. For example, the population of cells may be cultured for about 44-66 h, 44-60 h, 44-54 h or 44-48 h during the step of transduction with a vector. In one

22. The therapeutic cell population of claim 17 for use in medicine, wherein the therapeutic cell population is administered in combination with the support cell population of claim 18.

23. The support cell population of claim 18 for use in medicine, wherein the support cell population is administered in combination with the therapeutic cell population of claim 17.

24. The therapeutic cell population for use according to claim 21 or 22, wherein the therapeutic cell population is administered as part of an autologous stem cell transplant procedure or an allogeneic stem cell transplant procedure.

25. The support cell population for use according to claim 23, wherein the support cell population is administered as part of an autologous stem cell transplant procedure or an allogeneic stem cell transplant procedure.

26. The therapeutic or support cell population for use according to any of claims 21-24, wherein the therapeutic cell population is administered to a subject prior to administration of the support cell population.

27. The therapeutic or support cell population for use according to any of claims 22-25, wherein the therapeutic cell population is administered to a subject contemporaneously with or simultaneously to administration of the support cell population.

28. A kit comprising the therapeutic and support cell populations of claims 17 and 18.

~~29. A method of treatment comprising administering the therapeutic cell population of claim 17 to a subject in need thereof.~~

~~30. A method of treatment comprising administering the therapeutic cell population of claim 17 and the support cell population of claim 18 to a subject in need thereof.~~

~~31. The method of claim 30 wherein the therapeutic cell population is administered to the subject prior to administration of the support cell population.~~

~~32. The method of claim 30 wherein the therapeutic cell population is administered to the subject contemporaneously with or simultaneously to administration of the support cell population.~~

~~33.~~29. A haematopoietic progenitor cell population for use in gene therapy, wherein the haematopoietic progenitor cell population has been transduced with a nucleotide of interest.

~~34.~~30. A haematopoietic progenitor cell population for use in gene therapy, wherein said cells have been separated from a population of cells comprising haematopoietic stem and progenitor cells and then transduced with a nucleotide of interest.

~~35.~~31. The haematopoietic progenitor cell population for use according to claim ~~33~~ 29 or ~~34~~30, wherein the haematopoietic progenitor cell population has the $CD34^{+}CD38^{int}$ phenotype.

~~36.~~32. The haematopoietic progenitor cell population for use according to claim ~~33~~ 29 or ~~34~~30, wherein the haematopoietic progenitor cell population has a $CD34^{+}CD38^{int1}$, $CD34^{+}CD38^{int2}$ and/or $CD34^{+}CD38^{+}$ phenotype.

~~37.~~33. The haematopoietic progenitor cell population for use according to any of claims ~~33~~29-~~36~~32, wherein the transduced progenitor cell population is administered in combination with a population of haematopoietic stem cells.

~~38. A method of gene therapy comprising administering a haematopoietic progenitor cell population to a subject in need thereof, wherein the haematopoietic progenitor cell population has been transduced with a nucleotide of interest.~~

~~39. A method of gene therapy comprising administering a haematopoietic progenitor cell population to a subject in need thereof, wherein said cells have been separated from a population of cells comprising haematopoietic stem and progenitor cells and then transduced with a nucleotide of interest before administration to the subject.~~

~~40. The method of claim 38 or 39, wherein the haematopoietic progenitor cell population has the $CD34^{+}CD38^{int}$ phenotype.~~

~~41. The method of claim 38 or 39, wherein the haematopoietic progenitor cell population has a $CD34^{+}CD38^{int1}$, $CD34^{+}CD38^{int2}$ and/or $CD34^{+}CD38^{+}$ phenotype.~~

~~42. The method of any of claims 38-41, wherein the transduced progenitor cell population is administered in combination with a population of haematopoietic stem cells.~~

~~43.~~34. A method of controlling the duration of transgene expression in a patient, wherein the duration of transgene expression is controlled by selectively administering

transduced haematopoietic stem and/or progenitor cells based on CD38 expression level.

44.35. The method of claim 43-34 wherein increased transgene expression duration is be achieved by administering cells with decreased levels of CD38 expression.

45.36. Use of prostaglandin E2 or a prostaglandin E2 derivative for increasing gene transfer efficiency when transducing haematopoietic stem or progenitor cells with a vector.

46.37. The use of claim 45-36 wherein the prostaglandin E2 derivative is 16,16-dimethyl prostaglandin E2.

47.38. The use of claim 3645 or 4637 wherein the transduction of haematopoietic stem cells is carried out as part of the method of any of claims 1-16.