CLAIMS

1. A method of preparing a therapeutic cell population and a support cell population for clinical use from a starting population of cells comprising haematopoietic stem cells, said method comprising separating a population of cells that substantially do not express CD38 but which express CD34 from the starting population of cells, and transducing the separated cell population with a vector to obtain the therapeutic cell population which has the $CD34^+CD38^-$ phenotype, and wherein the separated CD38-expressing cells or portion thereof are retained to form a support cell population which has the $CD34^+CD38^{int/lo}$, $CD34^+CD38^{+/int}$ and/or $CD34^+CD38^+$ phenotype.

2. The method of claim 1, wherein the method comprises the steps of:

   a. separating CD38-expressing cells from a starting population of cells comprising haematopoietic stem cells;

   b. separating CD34-expressing cells from the population of cells obtained in step (a) that do not express CD38;

   c. transducing the CD34-expressing cell population obtained in step (b) with a vector to obtain the therapeutic cell population.

3. The method of claim 1 or 2, wherein the starting population of cells comprising haematopoietic stem cells is obtained from mobilised peripheral blood, bone marrow or umbilical cord blood.

4. The method of any preceding claim, wherein the CD38-expressing cells and/or CD34-expressing cells are separated using magnetic bead-based separation or flow cytometry.

5. The method of any preceding claim, wherein the vector is a viral vector, preferably a lentiviral vector.

6. The method of any preceding claim, wherein the step of transducing a population of cells with a vector comprises culturing the cells for less than about 44 h, preferably wherein the step of transducing a population of cells with a vector comprises culturing the cells for about 12-24 hours.

7. The method of any preceding claim, wherein the step of transducing a population of cells with a vector comprises treating the population of cells with prostaglandin E2 or 16,16-dimethyl prostaglandin E2, preferably wherein the cells are treated with prostaglandin E2 or 16,16-dimethyl prostaglandin E2 before exposure of the cells to the vector.

8. Use of a therapeutic cell population for the manufacture of a medicament, wherein the therapeutic cell population has the $CD34^+CD38^-$ phenotype and is prepared according to the method of any preceding claim, wherein the therapeutic cell population is to be administered in combination with a support cell population which has the $CD34^+CD38^{int/lo}$, $CD34^+CD38^{+/int}$ and/or $CD34^+CD38^+$ phenotype and is prepared according to the method of any preceding claim.

9. Use of a support cell population for the manufacture of a medicament, wherein the support cell population has the $CD34^+CD38^{int/lo}$, $CD34^+CD38^{+/int}$ and/or $CD34^+CD38^+$ phenotype and is prepared according to the method of any one of claims 1-7, wherein the support cell population is to be administered in combination with a therapeutic cell population which has the $CD34^+CD38^-$ phenotype and is prepared according to the method of any one of claims 1-7.

10. The use of claim 8 or 9, wherein the number of $CD34^+$ cells to be administered to a subject in the support cell population is about 5-15× the number of $CD34^+$ cells to be administered in the therapeutic cell population when the subject has undergone myeloablative conditioning.

11. The use of any one of claims 8-10, wherein the therapeutic and support cell populations are to be administered as part of an autologous stem cell transplant procedure or an allogeneic stem cell transplant procedure.

12. The use of any one of claims 8-11, wherein the therapeutic cell population is to be administered to a subject prior to administration of the support cell population, or wherein the therapeutic cell population is to be administered to a subject contemporaneously with or simultaneously to administration of the support cell population.

13. Use of a population of haematopoietic progenitor cells for the manufacture of a medicament, 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, wherein the haematopoietic progenitor cell population has a

phenotype selected from the group consisting of $CD34^+CD38^{int}$, $CD34^+CD38^{int/lo}$, $CD34^+CD38^{+/int}$ and $CD34^+CD38^+$, and wherein the transduced progenitor cell population is to be administered in combination with a population of haematopoietic stem cells.

5