

Claims:

1. A method for identifying a stem cell or plurality of stem cells, the method comprising determining the level of GSTT1 expression in said stem cell or plurality of stem cells; wherein the method further comprises comparing the level of GSTT1 expression determined to a reference value for the level of GSTT1 expression for that stem cell type; and wherein the method further comprises the step of identifying the stem cell or plurality of stem cells having decreased GSTT1 expression relative to the reference value; wherein decreased GSTT1 expression correlates with increased cell proliferation.

2. The method according to claim 1, wherein the method further comprises the step of separating and/or isolating the stem cell or plurality of stem cells having decreased GSTT1 expression relative to the reference value from other cells or stem cells.

3. A method for identifying a stem cell or plurality of stem cells, the method comprising determining the GSTT1 genotype of the stem cell or plurality of stem cells; wherein the method further comprises the step of identifying the stem cell or plurality of stem cells having a non-homozygous wildtype GSTT1 genotype; wherein decreased GSTT1 expression correlates with increased cell proliferation.

4. The method according to claim 3, wherein the method further comprises the step of separating and/or isolating a stem cell or plurality of stem cells having a non-homozygous wildtype GSTT1 genotype from other cells or stem cells.

5. The method according to any one of claims 1 to 4, wherein the stem cell or plurality of stem cells additionally possess one or more of the following characteristics as compared to a reference population of stem cells:

(i) enhanced colony forming capacity;

(ii) reduced cell size;

(iii) increased telomere length and/or a reduced rate of telomere shortening;

(iv) increased expression of STRO-1, SSEA-4, CD146 and/or PDGFR β ;

(v) increased secretion of FGF-2, VEGF, SDF-1 α , fractalkine, PDGF-BB and/or MIP-1 α ;

(vi) enhanced suppression of T cells;

(vii) decreased expression of ALP, RUNX2 and/or BSP-II

(viii) increased expression of TWIST-1 and DERMO-1.

6. A method for modifying a stem cell or plurality of stem cells, the method comprising contacting a stem cell or plurality of stem cells with an agent capable of modifying the cell(s) to reduce GSTT1 expression and/or function, wherein the agent is an inhibitory nucleic acid.

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7. The method of claim 6, wherein the method comprises:

(i) isolating a stem cell or plurality of stem cells from an individual, and;

(ii) contacting the isolated stem cell or plurality of stem cells *in vitro* with an agent capable of modifying a stem cell to reduce GSTT1 expression and/or function.

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8. A stem cell or plurality of stem cells, which have been modified to reduce endogenous GSTT1 expression and/or function, wherein the stem cell or plurality of stem cells has been modified using an inhibitory nucleic acid.

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9. A stem cell or plurality of stem cells, which contain an agent capable of reducing GSTT1 expression and/or function, wherein the agent is an inhibitory nucleic acid.

10. A stem cell or plurality of stem cells, which have been modified to have decreased GSTT1 expression and/or function relative to stem cells which are homozygous for wildtype GSTT1 and/or stem cells having the average (i.e. mean) level of GSTT1 expression and/or function for that stem cell type.

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11. An isolated stem cell or plurality of stem cells, which have decreased GSTT1 expression and/or function relative to stem cells which are homozygous for wildtype GSTT1.

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12. A stem cell or plurality of stem cells according to any one of claims 11 to 14 for use in a method of medical treatment.

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13. Use of a stem cell or plurality of stem cells according to any one of claims 11 to 14 in the manufacture of a medicament for regenerating tissue in a patient in need thereof.

14. A stem cell or plurality of stem cells according to any one of claims 11 to 14 for use in the treatment of a bone fracture, wherein the treatment comprises that the stem cells are to be administered to tissue surrounding the fracture.

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15. Use of a stem cell or plurality of stem cells according to any one of claims 11 to 14 for the generation of bone tissue *in vitro*.

16. A method for selecting a stem cell donor, the method comprising determining the genotype for GSTT1 in a DNA-containing sample isolated from an individual, wherein an individual determined to have a GSTT1 genotype which is known, and/or which would be predicted, to result in decreased expression of GSTT1 relative to individuals homozygous for wildtype GSTT1 is selected as a stem cell donor.

17. A method for selecting a stem cell donor, the method comprising:
 (i) determining the level of GSTT1 expression by a stem cell or plurality of stem cells in a sample isolated from an individual, and;
 (ii) comparing the level of GSTT1 expression determined in step (i) to a reference value for the level of GSTT1 expression for that stem cell type;
 wherein an individual determined to have a stem cell or plurality of stem cells having decreased GSTT1 expression relative to the reference value is selected as a stem cell donor.

18. The method according to claim 19 or claim 20, wherein the stem cell or plurality of stem cells additionally possess one or more of the following characteristics as compared to a reference population of stem cells:

- (i) enhanced colony forming capacity;
- (ii) reduced cell size;
- (iii) increased telomere length and/or a reduced rate of telomere shortening;
- (iv) increased expression of STRO-1, SSEA-4, CD146 and/or PDGFR β ;
- (v) increased secretion of FGF-2, VEGF, SDF-1 α , fractalkine, PDGF-BB and/or MIP-1 α ;
- (vi) enhanced suppression of T cells;
- (vii) decreased expression of ALP, RUNX2 and/or BSP-II
- (viii) increased expression of TWIST-1 and DERMO-1.

19. A method of enriching for colony forming units (CFU-F) in a culture of stem cells, preferably mesenchymal stem cells (MSC), the method comprising partitioning stem cells having a decreased level of GSTT1 expression.

20. A method of enriching for colony forming units (CFU-F) in a culture of stem cells, preferably mesenchymal stem cells (MSC), the method comprising partitioning stem cells not having a homozygous positive GSTT1 genotype.