CLAIMS

1. Use of stem cells or progenitor cells wherein the expression and/or activity of Glypican 4 is reduced or abolished, for the manufacture of a medicament intended for the treatment by stem cell-based therapy of a pathological condition selected from the group consisting of a degenerative disease, a cardiac disorder, a metabolic disease and an injury.

2. The use according to claim 1, wherein the stem cells are not stem cells from a human embryo.

3. The use according to claim 1 or 2, wherein the formation of teratomas is prevented.

4. An *in vitro* method for producing stem cells or progenitor cells reaching their next step of differentiation, when exposed to environmental conditions triggering cell differentiation, 1 to 5 days earlier than non-pretreated cells when exposed to similar environmental conditions triggering cell differentiation,
said method comprising reducing or abolishing the expression and/or activity of Glypican 4 in stem cells or progenitor cells;
thereby yielding stem cells or progenitor cells reaching their next of differentiation, when exposed to environmental conditions triggering cell differentiation, 1 to 5 days earlier than non-pretreated cells when exposed to similar environmental conditions triggering cell differentiation.

5. The method according to claim 4, wherein the stem cells are not stem cells from a human embryo.

6. Stem cells or progenitor cells obtainable by an *in vitro* method as defined in any one of claims 4 to 5.

7. Use of stem cells or progenitor cells obtainable by an *in vitro* method as defined in any one of claims 4 to 5 for the manufacture of a medicament intended for the treatment by stem cell-based therapy of a pathological condition selected from the group consisting of a degenerative disease, a cardiac disorder, a metabolic disease and an injury.

8. An *in vitro* method for producing differentiated cells from stem cells or progenitor cells comprising the steps consisting in:

a) producing, by the method defined in any of claims 4 to 5, stem cells or progenitor cells reaching their next of differentiation, when exposed to environmental conditions triggering cell differentiation, 1 to 5 days earlier than non-pretreated cells when exposed to similar environment conditions triggering cell differentiation; and

b) exposing the stem cells or progenitor cells produced in step a) to environmental conditions triggering cell differentiation;

whereby differentiated cells are produced.

9. Use of stem cells or progenitor cells produced by the *in vitro* method as defined in any one of claims 4 to 5 for toxicological screenings.

10. Use of Glypican 4 for specifically purifying stem cells, progenitor cells, cancer stem cells or tissue specific stem cells from a sample.

11. An *in vitro* method for specifically purifying stem cells, progenitor cells, cancer stem cells or tissue specific stem cells from a sample, wherein the sample is contacted with a ligand of Glypican 4;

thereby purifying stem cells, progenitor cells, cancer stem cells or tissue specific stem cells which are present in the sample.

12. Use of a modulator of the activity of Glypican 4 for the manufacture of a medicament intended for the treatment of cancer.

13. Use of an antagonist of the activity of Glypican 4 for the manufacture of a medicament intended for inducing tissue regeneration after a degenerative disease.

14. The use according to claim 13, for enhancing differentiation of tissue specific stem cells present in the tissue to be regenerated.

CLAIMS

1. An *in vitro* method for producing stem cells or progenitor cells reaching their next step of differentiation, when exposed to environmental conditions triggering cell differentiation, 1 to 5 days earlier than non-pretreated cells when exposed to similar environmental conditions triggering cell differentiation,
said method comprising reducing or abolishing the expression and/or activity of Glypican 4 in stem cells or progenitor cells;
thereby yielding stem cells or progenitor cells reaching their next of differentiation, when exposed to environmental conditions triggering cell differentiation, 1 to 5 days earlier than non-pretreated cells when exposed to similar environmental conditions triggering cell differentiation.

2. The method according to claim 1, wherein the stem cells are not stem cells from a human embryo.

3. Use of stem cells or progenitor cells wherein the expression and/or activity of Glypican 4 is reduced or abolished or of stem cells or progenitor cells obtainable by an *in vitro* method as defined in claim 1 or 2, for the manufacture of a medicament for the treatment by stem cell-based therapy of a pathological condition selected from the group consisting of a degenerative disease, a cardiac disorder, a metabolic disease and an injury.

4. The use according to claim 3, wherein the stem cells are not stem cells from a human embryo.

5. The use according to claim 3 or 4, wherein the formation of teratomas is prevented.

6. Stem cells or progenitor cells obtainable by an *in vitro* method as defined in any one of claims 1 to 2.

7. An *in vitro* method for producing differentiated cells from stem cells or progenitor cells comprising the steps consisting in:

a) producing, by the method defined in any of claims 1 to 2, stem cells or progenitor cells reaching their next of differentiation, when exposed to environmental conditions triggering cell differentiation, 1 to 5 days earlier than non-pretreated cells when exposed to similar environment conditions triggering cell differentiation; and

b) exposing the stem cells or progenitor cells produced in step a) to environmental conditions triggering cell differentiation;

whereby differentiated cells are produced.

8. Use of stem cells or progenitor cells produced by the *in vitro* method as defined in any one of claims 1 to 2 for toxicological screenings.

9. Use of Glypican 4 for specifically purifying stem cells, progenitor cells, cancer stem cells or tissue specific stem cells from a sample.

10. An *in vitro* method for specifically purifying stem cells, progenitor cells, cancer stem cells or tissue specific stem cells from a sample, wherein the sample is contacted with a ligand of Glypican 4;

thereby purifying stem cells, progenitor cells, cancer stem cells or tissue specific stem cells which are present in the sample.

11. Use of a modulator of the activity of Glypican 4 for the manufacture of a medicament for the treatment of cancer.

12. Use of an antagonist of the activity of Glypican 4 for the manufacture of a medicament for inducing tissue regeneration after a degenerative disease.

13. The use according to claim 12, for enhancing differentiation of tissue specific stem cells present in the tissue to be regenerated.