CLAIMS:

1. A method of transforming a cell of a first type to a desired cell of a different type, comprising:

i) providing a cell of a first type;

ii) transiently increasing in said cell of a first type intracellular levels of at least one reprogramming agent, whereby said transient increase induces direct or indirect endogenous expression of at least one gene regulator;

iii) placing the cell in conditions for supporting the transformation of the desired cell and maintaining intracellular levels of said at least one reprogramming agent for a sufficient period of time to allow stable expression of said at least one gene regulator in absence of the reprogramming agent; and

iv) maintaining the cell in culture conditions supporting the transformation of the desired cell for a sufficient period of time to allow a stable expression of a plurality of secondary genes whose expression is characteristic of phenotypical and/or functional properties of the desired cell, wherein at least one of said secondary genes is not characteristic of phenotypical and functional properties of an embryonic stem cell, whereby at the end of said period of time the cell of the first type has been transformed into the desired cell of a different type.

2. The method of claim 1, wherein the desired cell of a different type obtained is characterized by a stable repression of a plurality of genes expressed in the first cell type.

3. The method of claim 1 or 2, wherein said at least one reprogramming agent is a polynucleotide, a polypeptide, a compound or a small molecule.

4. The method of any one of claims 1 to 3, wherein said at least one reprogramming agent is a polynucleotide or a polypeptide, and wherein said polynucleotide or polypeptide comprises a sequence selected from the group of GenBank™, UniProt™ /Swiss-Prot™ or UniGene™ sequences whose accession numbers is listed in **TABLE A**.

5. The method of claim 4, wherein said at least one reprogramming agent is selected from the group consisting of the following: Musashi1 (Msi1); Msi1 and Neurogenin 2 (Ngn2); Msi1 and methyl-CpG binding domain protein 2 (MBD2); Ngn2 and MBD2, and Msi1, Ngn2 and MBD2.

6. The method of any one of claims 1 to 3, wherein said at least one reprogramming agent is a polypeptide, and wherein increasing intracellular levels of said at least one reprogramming agent comprises delivering said polypeptide intracellularly.

7. The method of claim 6, wherein said polypeptide delivering is delivered intracellularly by transfection.

8. The method of any one of claims 1 to 7, wherein said at least one gene regulator is a polynucleotide or a polypeptide, and wherein said polynucleotide or polypeptide comprises a sequence selected from the group of GenBank™, UniProt™ /Swiss-Prot™ or UniGene™ sequences whose accession numbers is listed in **TABLE A**.

9. The method of any one of claims 1 to 8, wherein said plurality of secondary genes are selected from the group of genes comprising a polynucleotide or encoding a polypeptide for which polynucleotide or polypeptides sequences whose accession numbers is listed in GenBank™, UniProt™ /Swiss-Prot™ or UniGene™ accession number provided in **TABLE A**.

10. The method of any one of claims 1 to 9, wherein expression of secondary genes characteristic of phenotypical and/or functional properties of the desired cell is characterized by the expression of one or more markers defined according to the following table:

Desired cell type	**Markers**
Neural stem-like cells	Nestin, Sox2, GFAP, Msi1
Neural-like cells	ßIII-tubulin, Map2b, Synapsin, ACHE
Ectoderm-like cells	Sox2, Sox1, Zic1, Nestin, Notch 1, FoxJ3, Otx2, Cripto1, Vimentin
Mesendoderm-like cells	Sox17, FoxA2, CXCR4, GATA4, Mixl1, Eomesodermin
Pluripotent-like cells	Oct4, SSEA4, TRA-1-60, TRA-1-81, AP

11. The method of claim 2, wherein said plurality of genes whose expression is stably repressed are selected according to the genes listed in **TABLE C**.

12. The method of claim 2, wherein a stable repression of a plurality of genes expressed in the first cell type is characterized by disappearance of corresponding cell markers as defined in **Table C**.

13. The method of any one of claims 1 to 12, wherein step ii) is carried out consecutively to step iii) or simultaneously with step iii).

14. The method of any one of claims 1 to 13, further comprising contacting the chromatin and/or DNA of the cell of the first type with an agent capable of remodeling chromatin and/or DNA of said cell.

15. The method of claim 14, wherein the agent capable of remodeling chromatin and/or DNA is selected from the group consisting of histone acetylators, inhibitors of histone deacetylation, DNA demethylators, inhibitors of DNA methylation and combination thereof.

16. The method of claim 15, wherein the inhibitor of DNA methylation is selected from the group consisting of 5-azacytidine, 5-aza-2-deoxycytidine, 1-β-D-arabinofuranosil-5-azacytosine, dihydro-5-azacytidine, zebularine, and RG108; wherein the inhibitor of histone deacetylation is selected from the group consisting of valproic acid, phenylbutyrate, Trichostatin A, Na-butyrate, benzamides, and cyclic tetrapeptides, and wherein the DNA demethylator is MBD2.

17. The method of any one of claims 1 to 16, further comprising treating the cell of a first type with a cytoskeleton disruptor.

18. The method of any one of claims 1 to 17, wherein the cell of a first type is selected from the group consisting of: germ cells, embryonic stem cells and derivations thereof, adult stem cells and derivations thereof, progenitor cells and derivations thereof, cells derived from mesoderm, endoderm or ectoderm, and a cell of mesoderm, endoderm or ectoderm lineage.

19. The method of claims 1 to 17, wherein the cell of a first type is selected from the group consisting of: adipose-derived stem cell, mesenchymal stem cell, hematopoietic stem cell, skin derived precursor cell, hair follicle cell, fibroblast, keratinocyte, epidermal cell, endothelial cell, epithelial cell, granulosa epithelial cell, melanocyte, adipocyte, chondrocyte, hepatocyte, B lymphocyte, T lymphocyte, granulocyte, macrophage, monocyte, mononuclear cell, pancreatic islet cell, sertoli cell, neuron, glial cell, cardiac muscle cell, and other muscle cell.

20. The method of any one of claims 1 to 17, wherein the cell of a second different type is selected from the group consisting of: germ cells, embryonic stem cells and derivations thereof, adult stem cells and derivations thereof, progenitor cells and derivations thereof, cells derived from mesoderm, endoderm or ectoderm, and a cell of mesoderm, endoderm or ectoderm lineage.

21. The method of any one of claims 1 to 17, wherein the cell of a second different type is selected from the group consisting of: adipose-derived stem cell, mesenchymal stem cell, hematopoietic stem cell, skin derived precursor cell, hair follicle cell, fibroblast, keratinocyte, epidermal cell, endothelial cell, epithelial cell, granulosa epithelial cell, melanocyte, adipocyte, chondrocyte, hepatocyte, B lymphocyte, T lymphocyte, granulocyte, macrophage, monocyte, mononuclear cell, pancreatic islet cell, sertoli cell, neuron, glial cell, cardiac muscle cell, and other muscle cell.

22. The method of any one of claims 1 to 17, wherein the desired cell is a Neural Stem-Like Cell (NSLC) and wherein placing the cell in culture conditions for supporting the transformation of NSLC comprises contacting the cell with a culture media comprising one or more of factors selected from the group consisting of: a retinoid compound, a neurotrophic factor, bFGF, EGF,

SHH, Wnt3a, transforming growth factor alpha, neuropeptide Y, Estrogen, Lithium and L-Ascorbic acid.

23. The method of claim 22, wherein the cell of a first type is selected from the group consisting of: adipose-derived stem cell, hematopoietic stem cell, fibroblast, and keratinocyte.

24. A method of transforming a cell of a first type to a cell of a desired cell of a different type, comprising:

- increasing intracellular levels of at least one reprogramming agent, wherein said at least one reprogramming agent is selected for inducing directly or indirectly the expression of morphological and/or functional characteristics of a desired second cell type;
- maintaining the cell of a first type in culture conditions for supporting the transformation of the desired cell for a sufficient period of time to allow stable expression of a plurality of secondary genes whose expression is characteristic of phenotypical and/or functional properties of the desired cell, wherein at least one of said secondary genes is not characteristic of phenotypical and/or functional properties of an embryonic stem cell,

whereby at the end of said period of time the desired cell of a different type is obtained and wherein said obtained cell is further characterized by a stable repression of a plurality of genes expressed in the first cell type.

25. A method of obtaining a Stem-Like Cell (SLC), comprising:

i) providing a cell of a first type;

ii) transiently increasing in said cell intracellular levels of at least one reprogramming agent, whereby said transient increase induces direct or indirect endogenous expression of at least one gene regulator;

iii) placing the cell in conditions for supporting the transformation of stem-like cell and maintaining intracellular levels of said at least one reprogramming agent for a sufficient period of time to allow stable expression of said at least one gene regulator in absence of the reprogramming agent;

iv) maintaining the cell in culture conditions for supporting the transformation of said stem-like cell for a sufficient period of time to allow stable expression of a plurality of secondary genes whose expression is characteristic of phenotypical and/or functional properties of said stem-like cell, wherein at least one of said secondary genes is not characteristic of phenotypical and functional properties of an embryonic stem cell, whereby at the end of said period of time of a stem-like cell is obtained.

26. The method of claim 25, wherein the stem-like cell is a Neural Stem-Like Cell (NSLC), wherein said at least one reprogramming agent Is selected from the group consisting of: Musashi1 (Msi1); Msi1 and Neurogenin 2 (Ngn2); Msi1 and methyl-CpG binding domain protein 2 (MBD2); Ngn2 and MBD2; and Msi1, Ngn2 and MBD2, and wherein said at least one gene regulator is selected from the group consisting of Sox2, Nestin, and Msi1.

27. A method of obtaining a Neural Stem-Like Cell (NSLC), comprising:

- providing a cell of a first type;
- introducing into said cell one or more polynucleotide capable of transient expression of one or more the following polypeptides: a Musashi1 (Msi1) polypeptide; a Musashi1 (Msi1) and a Neurogenin 2 (Ngn2) polypeptide; a Musashi1 (Msi1) and methyl-CpG binding domain protein 2 (MBD2) polypeptide; Neurogenin 2 (Ngn2) and methyl-CpG binding domain protein 2 (MBD2); a Musashi1 (Msi1), Neurogenin 2 (Ngn2) polypeptide, and methyl-CpG binding domain protein 2 (MBD2) polypeptide; and
- placing the cell in culture conditions supporting the transformation into a NSLC for a sufficient period of time to allow a stable expression of a plurality of genes whose expression is characteristic of phenotypical and/or functional properties of a NSLC;

whereby at the end of said period of time a NSLC is obtained and wherein said obtained NSLC is further characterized by a stable repression of a plurality of genes expressed in the first cell type.

28. The method of claim 27, wherein placing the cell in culture conditions for supporting the transformation of NSLC comprises contacting the cell with a culture media comprising one or more of factors selected from the group consisting of: a retinoid compound, a neurotrophic factor, bFGF, EGF, SHH, Wnt3a, transforming growth factor alpha, neuropeptide Y, Estrogen, Lithium and L-Ascorbic acid.

29. A method of obtaining a Neural Stem-Like Cell (NSLC), comprising:

- providing a cell of a first type which is not a NSLC;
- increasing intracellular levels of at least one neural stem cell specific polypeptide, wherein said polypeptide is capable of driving directly or indirectly transformation of the cell of the first type into a NSLC; and
- contacting chromatin and/or DNA of the cell of a first type with a histone acetylator, an inhibitor of histone deacetylation, a DNA demethylator, and/or a chemical inhibitor of DNA methylation

whereby a NSLC is obtained.

30. The method of claim 29, further comprising treating the cell of a first type with a cytoskeleton disruptor.

31. The method of claim 29 or 30, wherein increasing intracellular levels of at least one neural stem cell specific polypeptide comprises transiently transfecting the cell of a first type with an expression vector allowing expression of a Musashi1 (Msi1) polypeptide; a Musashi1 (Msi1) and a Neurogenin 2 (Ngn2) polypeptide; a Musashi1 (Msi1) and methyl-CpG binding domain protein 2 (MBD2) polypeptide; a Neurogenin 2 (Ngn2) and methyl-CpG binding domain protein 2 (MBD2) polypeptide; or a Musashi1 (Msi1), Neurogenin 2 (Ngn2) polypeptide, and methyl-CpG binding domain protein 2 (MBD2) polypeptide.

32. The method of any one of claims 29 to 31 wherein the inhibitor of DNA methylation is selected from the group consisting of 5-azacytidine, 5-aza-2-deoxycytidine, 1-β-D-arabinofuranosil-5-azacytosine, dihydro-5-azacytidine, zebularine, and RG108; wherein the inhibitor of histone deacetylation is selected from the group consisting of valproic acid, phenylbutyrate, Trichostatin A, Na-butyrate, benzamides, and cyclic tetrapeptides and wherein the DNA demethylator is MBD2.

33. The method of any one of claims 29 to 32, further comprising culturing the cell in a media comprising one or more factors appropriate for maintaining, supporting and/or inducing the morphological and functional characteristics of a NSLC.

34. The method of claim 33, wherein said one or more factor is selected from the group consisting of: a retinoid compound, a neurotrophic factor, bFGF, EGF, SHH, Wnt 3a, Transforming growth factor alpha, neuropeptide Y, Estrogen, Lithium and L-Ascorbic acid.

35. The method of any one of claims 29 to 34, wherein the NSLC so obtained possesses one or more of the following characteristics:

- expression of one or more neural stem cell marker selected from the group consisting of Sox2, Nestin, GFAP, Msi1, and Ngn2;
- decreased expression of one or more genes specific of the cell of the fist type;
- forms neurospheres in the neurosphere colony formation assay;
- capable of being cultured in suspension or as an adherent culture;
- capable of proliferating without the presence of an exogenous reprogramming agent for over 1 month;
- capable of dividing every 36 hours at low passage;
- positive for telomerase activity;
- capable of differentiation into a neuronal-like cell, astrocyte-like cell, oligodendrocyte-like cell and combinations thereof;
- decreased expression of telomerase and one or more neural stem cell markers;

- having one or more morphological neurite-like processes (axons and/or dendrites) greater than one cell diameter in length;
- expression of at least one neural-specific antigen selected from the group consisting of neural-specific tubulin, microtubule associated protein 2, NCAM, and marker for a neurotransmitter;
- expression of one or more functional neural markers;
- capable of releasing one or more neurotrophic factors;
- negative in a tumor colony forming assay;
- negative for tumor growth in SCID mice;
- negative for teratoma growth in SCID mice;
- capable of significantly improving one or more functional measures after placement of an adequate number of NSLCs into the void in a brain ablation model;
- capable of significantly improving or maintaining one or more functional measures after injecting an adequate number of NSLCs into an EAE model; and
- capable of improving one or more functional measures more significantly than hNPCs in CNS injury or neurodegenerative models.

36. The method of any one of claims 29 to 34, wherein the NSLC so obtained possesses all of the following characteristics:

- ability to self-renew for significantly longer than a somatic cell;
- is not a cancerous cell;
- is stable and not artificially maintained by forced gene expression or by similar means and may be maintained in standard neural stem cell media;
- can differentiate to a progenitor, precursor, somatic cell or to another more differentiated cell type of the same lineage;
- has the characteristics of a stem cell and not just certain markers or gene expression or morphological appearance; and
- does not exhibit uncontrolled growth, teratoma formation, and tumor formation *in vivo*.

37. The method of any one of claims 29 to 35, wherein a plurality of NSLCs are obtained and wherein said plurality of NSLCs are organized within a three-dimensional structure.

38. A method for obtaining a Neural Stem-Like Cell (NSLC), from a non-NSLC, comprising:

-obtaining a non-NSLC;

-co-transfecting the non-NSLC with a first polynucleotide encoding a MBD2 polypeptide and with at least one second polynucleotide encoding a MUSASHI1 polypeptide and/or encoding a NGN2 polypeptide;

- placing the co-transfected cell in culture conditions for supporting the transformation into a NSLC until said NSLC is obtained.

39. The method of claim 38, wherein said non-NSLC is selected from a keratinocyte, a Adipocyte Derived Stem Cell (ADSCs) and a human hematopoietic stem cells.

40. A cell line obtained using any one of the methods of claims 1 to 38.

41. A stem-like cell possessing all of the following characteristics:

- ability to self-renew for significantly longer than a somatic cell;
- is not a cancerous cell;
- is stable and not artificially maintained by forced gene expression or by similar means and may be maintained in standard neural stem cell media;
- can differentiate to a progenitor, precursor, somatic cell or to another more differentiated cell type of the same lineage;
- has the characteristics of a stem cell and not just certain markers or gene expression or morphological appearance; and
- does not exhibit uncontrolled growth, teratoma formation, and tumor formation *in vivo*.

42. A Neural Stem-Like Cell (NSLC) possessing one or more of the following characteristics:

- expression of one or more neural stem cell marker selected from the group consisting of Sox2, Nestin, GFAP, Msi1, and Ngn2;
- decreased expression of one or more genes specific of the cell of the fist type;
- forms neurospheres in the neurosphere colony formation assay;
- capable of being cultured in suspension or as an adherent culture;
- capable of proliferating without the presence of an exogenous reprogramming agent for over 1 month;
- capable of dividing every 36 hours at low passage;
- positive for telomerase activity;
- capable of differentiation into a neuronal-like cell, astrocyte-like cell, oligodendrocyte-like cell and combinations thereof;
- decreased expression of telomerase and one or more neural stem cell markers;
- having one or more morphological neurite-like processes (axons and/or dendrites) greater than one cell diameter in length;

- expression of at least one neural-specific antigen selected from the group consisting of neural-specific tubulin, microtubule associated protein 2, NCAM, and marker for a neurotransmitter;
- expression of one or more functional neural markers;
- capable of releasing one or more neurotrophic factors;
- negative in a tumor colony forming assay;
- negative for tumor growth in SCID mice;
- negative for teratoma growth in SCID mice;
- capable of significantly improving one or more functional measures after placement of an adequate number of NSLCs into the void in a brain ablation model;
- capable of significantly improving or maintaining one or more functional measures after injecting an adequate number of NSLCs into an EAE model; and
- capable of improving one or more functional measures more significantly than hNPCs in CNS injury or neurodegenerative models.

43. The neural stem-like cell of claim 42, wherein the NSLC so obtained possesses all of the following characteristics:

- ability to self-renew for significantly longer than a somatic cell;
- is not a cancerous cell;
- is stable and not artificially maintained by forced gene expression or by similar means and may be maintained in standard neural stem cell media;
- can differentiate to a progenitor, precursor, somatic cell or to another more differentiated cell type of the same lineage;
- has the characteristics of a stem cell and not just certain markers or gene expression or morphological appearance; and
- does not exhibit uncontrolled growth, teratoma formation, and tumor formation *in vivo*.

44. The NSLC of claim 42 or 43, wherein said NSLC is derived from the dedifferentiation, transformation or reprogramming of a somatic cell, a progenitor cell or of a stem cell.

45. An artificial tissue construct, comprising a 3D assembly of *in vitro* cultured cells, wherein said 3D assembly comprises: a plurality of desired cells obtained using any one of the methods of claims 1 to 24, a plurality of SLC obtained using any one of the methods of claims 25 or 26, a plurality of Neural Stem-Like Cell (NSLC) obtained using any one of the methods of claims 27 to 39, a plurality of SLC as defined in claim 41, and/or a plurality of NSLC as defined in any one of claims 42 to 44: and an extracellular matrix produced by these cells.

46. A method of regenerating a mammalian tissue or organ, comprising: providing a plurality of desired cells obtained using any one of the methods of claims 1 to 24, a plurality of SLC

obtained using any one of the methods of claims 25 or 26, a plurality of Neural Stem-Like Cell (NSLC) obtained using any one of the methods of claims 27 to 39, a plurality of SLC as defined in claim 41, and/or a plurality of NSLC as defined in any one of claims 42 to 44; and contacting the tissue or organ to be regenerated with said plurality of desired cells, SLC, and/or NSLC.

47. The method of claim 46, wherein said desired cells, SLC, and/or NSLC are placed in proximity to the tissue or organ to be regenerated.

48. A method for repairing or regenerating a tissue or organ in a subject in need thereof, the method comprising contacting said tissue or organ with a plurality of desired cells obtained using any one of the methods of claims 1 to 24, a plurality of SLCs obtained using any one of the methods of claims 25 or 26, a plurality of Neural Stem-Like Cells (NSLCs) obtained using any one of the methods of claims 27 to 39, a plurality of SLCs as defined in claim 41, a plurality of NSLCs as defined in any one of claims 42 to 44; and/or an artificial tissue construct as defined in claim 45.

49. A method for repairing or regenerating a tissue or organ in a subject in need thereof, the method comprising administering to the subject a compound inducing a direct or indirect endogenous expression of at least one gene regulator in cells of said tissue or organ and/or a compound inducing a direct or indirect endogenous expression of at least one gene regulator in cells capable of transformation, dedifferentiation or being reprogrammed *in vivo* in said subject, wherein expression of said at least one gene regulator reprograms said cells into desired cells of a different type, and wherein said cells of a different type are effective in repairing or regenerating said tissue or organ.

50. The method of claim 49, wherein said desired cells of a different type are stem-like cells.

51. The method of claim 49 or 50, wherein said tissue or organ is selected from the group consisting of the brain, the spine cord, the heart, the eye, the retina, the cochlea, the skin, muscles, intestines, pancreas, kidney, liver, lungs, bone, bone marrow, cartilage, cartilage discs, hair follicles, teeth, blood vessels, endocrine glands, exocrine glands, ovaries, reproductive organs, mammary tissue and breast tissue.

52. A process wherein a cell of a first type is reprogrammed to a desired cell of a different type, comprising:

- a transient increase of intracellular levels of at least one reprogramming agent, wherein said at least one reprogramming agent induces a direct or indirect endogenous expression of at least one gene regulator, wherein said endogenous expression of the least one gene regulator is necessary for the existence of the desired cell of a different type;

- a stable expression of said at least one gene regulator;
- stable expression of a plurality of secondary genes, wherein the stable expression of said plurality of secondary genes is the result of the stable expression of the at least one gene regulator, and wherein: (i) stable expression of s plurality of secondary genes is characteristic of phenotypical and/or functional properties of the desired cell, (ii) stable expression of at least one of said secondary genes is not characteristic of phenotypical and functional properties of an embryonic stem cell, and wherein (i) and (ii) are indicative of successful reprogramming of the cell of the first type to the desired cell of the different type.

53. The process of claim 52, wherein the at least one reprogramming agent is a polypeptide selected from the group consisting a Msi1 polypeptide, or a Ngn2 polypeptide and a MDB2 polypeptide.

54. The process of claim 52 or 53, wherein the at least one gene regulator is a polypeptide selected from the group consisting Sox2, Msi1 and combinations thereof.

55. The process of claim any one of claims 52 to 54, wherein the desired cell is a Neural Stem-Like Cell (NSLC) and wherein the cell of the first type is a cell selected from keratinocyte, Adipocytes Derived Stem Cell (ADSCs) and human hematopoietic stem cell.

CLAIMS

1. A process in which a cell of a first type is reprogrammed to a desired cell of a different type that is multipotent or unipotent, the process comprising:

(1) transiently applying at least one reprogramming agent to the cell of a first type, in which the reprogramming agent induces a direct or indirect remodelling of the chromatin and/or DNA and endogenous expression of at least one gene regulator, in which said endogenous expression of the gene regulator is necessary for the existence of the desired cell of a different type;

(2) permitting the stable expression of the gene regulator; and

(3) permitting the stable expression of a plurality of secondary genes, in which the stable expression of the secondary genes is the result of the stable expression of the gene regulator(s), and in which: (i) the stable expression of the plurality of secondary genes is characteristic of the phenotypical and/or functional properties of the desired cell, and (ii) the stable expression of at least one of said secondary genes is not characteristic of phenotypical and functional properties of a totipotent or pluripotent stem cell.

2. A process according to Claim 1, in which:

step (1) comprises placing the cell in conditions for supporting the transformation of the desired cell and maintaining intracellular levels of the reprogramming agent for a sufficient period of time to allow stable expression of the gene regulator in the absence of the reprogramming agent; and

step (3) comprises maintaining the cell in culture conditions supporting the transformation of the desired cell for a sufficient period of time to allow a stable expression of the plurality of secondary genes, whereby at the end of said period of time the cell of the first type has been transformed into the desired cell of a different type.

3. A process according to Claim 1 or 2, further comprising contacting the chromatin and/or DNA of the cell of the first type with an agent capable of remodeling chromatin and/or DNA of said cell, in which the agent capable of remodeling chromatin and/or DNA is selected from the group consisting of histone acetylators, inhibitors of histone deacetylation, DNA demethylators, inhibitors of DNA methylation and combinations thereof.

4. A process according to Claim 1 or 2 in which the desired cell of a different type is then differentiated into a somatic cell.

5. A process according to Claim 1 or 2 in which the unipotent cell is a differentiated cell.

6. A process according to any preceding claim, in which the desired cell of a different type obtained is characterized by a stable repression of a plurality of genes expressed in the first cell type.

7. A process according to any preceding claim, in which the reprogramming agent is selected from the group consisting of Musashi1 (Msi1); Msi1 and Neurogenin 2 (Ngn2); Msi1 and methyl-CpG binding domain protein 2 (MBD2); Ngn2 and MBD2; Msi1, Ngn2 and MBD2; Ascl1; Sox2; Mesp1; T; Sox17; Pdx1; Ngn3; Oct4; FoxD3; Mixl1; nanog; Rex1; Klf4; FoxD3 and Mixl1; Sall4, Oct4, Klf4 and nanog; and Oct4, Klf4 and Sall4.

8. A process according to any preceding claim, in which the reprogramming agent is delivered intracellularly.

9. A process according to any of Claims 2 to 8, in which the desired cell of a different type is selected from the group consisting of: a neural stem-like cell expressing one or more of Nestin, Sox2, GFAP and Msi1; a neural-like cell expressing one or more of βIII-tubulin, Map2b, Synapsin, and ACHE; an ectoderm-like cell expressing one or more of Sox2, Sox1, Zic1, Nestin, Notch 1, FoxJ3, Olx2, Cripto1 and Vimentin; a mesendoderm-like cell expressing one or more of Sox17, FoxA2, CXCR4, GATA4, Mix1 and Eomesodermin; and a pluripotent-like cell expressing one or more of Oct4, SSEA4, TRA-1-60, TRA-1-81 and AP.

10. A process according to any preceding claim, in which the cell of a first type is selected from the group consisting of: germ cells, embryonic stem cells and derivations thereof, adult stem cells and derivatives thereof, progenitor cells and derivatives thereof, cells derived from mesoderm, endoderm or ectoderm, and a cell of mesoderm, endoderm or ectoderm lineage, adipose-derived stem cell, mesenchymal stem cell, hematopoietic stem cell, skin derived precursor cell, hair follicle cell, fibroblast, keratinocyte, epidermal cell, endothelial cell, epithelial cell, granulosa epithelial cell, melanocyte, adipocyte, chondrocyte, hepatocyte, B lymphocyte, T lymphocyte, granulocyte, macrophage, monocyte, mononuclear cell, pancreatic islet cell, sertoli cell, neuron, glial cell, cardiac muscle cell, and other muscle cell.

11. A process according to any preceding claim, in which the desired multipotent or unipotent cell is neural , and in which the reprogramming agent is an expression vector allowing expression of a Musashi1 (Msi1) polypeptide; Musashi1 (Msi1) and Neurogenin 2 (Ngn2) polypeptides; Musashi1 (Msi1) and methyl-CpG binding domain protein 2 (MBD2) polypeptides; Neurogenin 2 (Ngn2) and methyl-CpG binding domain protein 2 (MBD2) polypeptides; or Musashi1 (Msi1), Neurogenin 2 (Ngn2) and methyl-CpG binding domain protein 2 (MBD2) polypeptides.

12. A process according to Claim 11, in which the neural multipotent or unipotent cell so obtained possesses all of the following characteristics:

(i) ability to self-renew or proliferate, except in the case of a terminally differentiated somatic cell;

(ii) is not a cancerous cell;

(iii) is stable and not artificially maintained by forced gene expression or by similar means;

(iv) can differentiate to at least one of a progenitor cell, a precursor cell, a somatic cell and another more differentiated cell type of the same lineage, except if the cell is a terminally differentiated somatic cell;

(v) does not exhibit uncontrolled growth, teratoma formation, and tumour formation *in vivo*.

13. A process according to Claim 11 or 12 in which the cell of the first type is a somatic cell, a progenitor cell or a stem cell.

14. An isolated neural multipotent or unipotent cell obtainable by a process according to any preceding claim in which the reprogramming agent is an expression vector allowing expression of Musashi1 (Msi1), Neurogenin 2 (Ngn2) and methyl-CpG binding domain protein 2 (MBD2) polypeptides, and in which the cell expresses one or more neural stem cell markers selected from the group consisting of Sox2, Nestin, GFAP, Msi1, and Ngn2; expresses at least one neural-specific antigen selected from the group consisting of neural-specific tubulin, microtubule associated protein 2, NCAM, and marker for a neurotransmitter; is not of a totipotent or pluripotent lineage; and does not exhibit tumor or teratoma formation *in vivo*.

15. An isolated multipotent cell obtainable by the process a process according to any of Claims 1 to 13, possessing all of the following characteristics:

(i) expression of at least one marker that is characteristic of a first multipotent cell phenotype and at least one marker that is characteristic of another multipotent or unipotent cell phenotype;

(ii) ability to self-renew for at least two months;

(iii) is not a cancerous cell;

(iv) is stable and not artificially maintained by forced gene expression or by similar means;

(v) can differentiate to at least one of a progenitor, precursor, somatic cell or to another more differentiated cell type of the same lineage; and

(vi) does not exhibit uncontrolled growth, teratoma formation, and tumor formation *in vivo*; and

(vii) is negative for teratoma growth in SCID mice.

16. A cell according to Claim 14 or 15 for use in a method of treatment of disease or to effect regeneration or repair of a tissue or organ or a desired therapeutic characteristic in a patient.