WHAT IS CLAIMED IS:

1. Reprogrammed cells for use in replenishing tissue or cells of a cell lineage in a patient, said reprogrammed cells obtained by a method comprising (i) obtaining committed cells of a first cell lineage; and (ii) reprogramming the committed cells to obtain reprogrammed cells,

wherein the patient is suffering from a condition, disease or disorder selected from the group consisting of bone marrow failure, haematological conditions, aplastic anemia, beta-thalassemia, motor neuron disease, Parkinson's disease, spinal cord injury, muscular dystrophy, kidney disease, multiple sclerosis, congestive heart failure, hepatitis C virus, human immunodeficiency virus, head trauma, lung disease, depression, non-obstructive azoospermia, andropause, menopause and infertility, rejuvenation, scleroderma ulcers, psoriasis, wrinkles, autoimmune disease, alopecia, retinitis pigmentosa, crystalline dystrophy/blindness, diabetes, liver cirrhosis, and infertility,

wherein the reprogramming comprises transdifferentiation of the committed cells to obtain transdifferentiated cells, by culturing the committed cells in a tissue culture medium comprising one or more retrodifferentiation agents and one or more differentiation promoting agents.

2. The reprogrammed cells of claim 1, wherein the retrodifferentiation agent engages a receptor that mediates capture, recognition or presentation of an antigen at the surface of the committed cells.

3. The reprogrammed cells of claim 1, wherein the reprogrammed cells are selected from the group consisting of pluripotent stem cells, haematopoietic stem cells, neuronal stem cells, epithelial stem cells, mesenchymal stem cells, endodermal and neuroectodermal stem cells, germ cells, extraembryonic, embryonic stem cells, kidney cells, alveolar epithelium cells, alveolar endoderm cells, neurons, ectoderm cells, islet cells, acinar cells, oocytes, sperm, hepatocytes, keratinocytes, melanocytes, osteocytes, dermal papilla cells, chondrocytes, adipocytes, endothelium cells, cardiomyocytes, and tropoblasts.

4. The reprogrammed cells of claim 1, wherein the committed cells are obtained from whole blood, bone marrow, neuronal tissue, muscle tissue, epidermis or dermis.

5. The reprogrammed cells of claim 4, wherein the committed cells are obtained from whole blood.

6. The reprogrammed cells of claim 5, wherein the committed cells are obtained through apheresis; or wherein the committed cells are obtained from mobilized or unmobilized blood; or wherein the committed cells are selected from the group consisting of include T cells, B cells, eosinophils, basophils, neutrophils, megakaryocytes, monocytes, erythrocytes, granulocytes, mast cells, lymphocytes, leukocytes, platelets, and red blood cells.

7. The reprogrammed cells of claim 2, wherein the agent is a monoclonal antibody to the receptor.

8. The reprogrammed cells of claim 5, wherein the antibody is selected from the group consisting of monoclonal antibody CR3/43 and the monoclonal antibody TAL 1B5.

9. The reprogrammed cells of claim 1, wherein the transdifferentiated cells are administered via injection or implantation.

10. The reprogrammed cells of claim 9, wherein the transdifferentiated cells are administered by parenteral, intramuscular, intravenous, subcutaneous, intraocular, oral, transdermal injection, or injection into spinal fluid.

11. The reprogrammed cells of claim 1, wherein the tissue culture medium is selected from the group consisting of Iscove's Modified Dulbecco's Medium (IMDM), Dulbecco's Modified Eagle Medium (DMEM), Eagle's minimum essential (EME) medium, alpha-minimum essential medium (a-MEM), Roswell Park Memorial Institute (RPMI; site where medium was developed) 1640, Ham-F-12, E199, MCDB, Leibovitz L-15, and Williams Medium E or any commercially available culture media.

12. The reprogrammed cells of claim 1, wherein the differentiation promoting agent is an anticoagulant, chelating agent, or antibiotic.

13. The reprogrammed cells of claim 1, wherein the differentiation promoting agent is a vitamin, or mineral.

14. The reprogrammed cells of claim 13, wherein the vitamin, or mineral, is selected from the group consisting of vitamin A, vitamin B3, vitamin C, vitamin D3, vitamin K, retinoic acid, nicotinamide, zinc or zinc compound, and calcium or calcium compounds.

15. The reprogrammed cells of claim 1, wherein the differentiation promoting agent is a natural or synthetic hormone.

16. The reprogrammed cells of claim 15, wherein the natural or synthetic hormone is hydrocortisone or dexamethasone.

17. The reprogrammed cells of claim 1, wherein the differentiation promoting agent is an amino acid.

18. The reprogrammed cells of claim 17, wherein the amino acid is selected from the group consisting of L-glutamine (L-glu), ergothioneine (EGT), praline, and non-essential amino acids (NEAA).

19. The reprogrammed cells of claim 1, wherein the differentiation promoting agent is a chemical compound.

20. The reprogrammed cells of claim 19, wherein the chemical compound is selected from the group consisting of 3-mercaptoethal, dibutyl cyclic adenosine monophosphate (db-cAMP), monothioglycerol (MTG), putrescine, dimethyl sulfoxide (DMSO), hypoxanthine, adenine, forskolin, cilostamide, and 3-isobutyl-1-methylxanthine.

21. The reprogrammed cells of claim 1, wherein the differentiation promoting agent is a nucleoside.

22. The reprogrammed cells of claim 21, wherein the nucleoside is 5-azacytidine.

23. The reprogrammed cells of claim 1, wherein the differentiation promoting agent is an acids or salt thereof.

24. The reprogrammed cells of claim 23, wherein the acid or salt thereof is selected from the groups consisting of ascorbic acid, pyruvate, okadic acid, linoleic acid, ethylenediaminetetraacetic acid (EDTA), disodium EDTA, ethylene glycol tetraacetic acid (EGTA), Anticoagulant Citrate Dextrose Formula A (ACDA), sodium butyrate, and glycerophosphate.

25. The reprogrammed cells of claim 1, wherein the differentiation promoting agent is an antibiotic or drug.

26. The reprogrammed cells of claim 25, wherein the antibiotic or drug is selected from the group consisting of G418, gentamycine, Pentoxifylline (1-(5-oxohexyl)-3, 7-dimethylxanthine), and indomethacin.

27. The reprogrammed cells of claim 1, wherein the differentiation promoting agent is a protein.

28. The reprogrammed cells of claim 27, wherein the protein is tissue plasminogen activator (TPA).

29. The reprogrammed cells of claim 1, wherein the tissue culture medium contains autologous plasma, platelets, serum, or sera of mammalian origin.

30. The reprogrammed cells of claim 1, wherein the cells are cultured in blood bags, scaffolds, tissue culture bags, or plastic tissue culture vessels.

31. The reprogrammed cells of claim 30, wherein the tissue culture vessels are adherent or non-adherent tissue culture vessels; or b) wherein the tissue culture vessels are coated or uncoated.

32. The reprogrammed cells of claim 31, wherein the tissue culture vessels are coated with an agent selected from the group consisting of gelatin, collagen, matrigel, or extracellular matrix.

33. The reprogrammed cells of claim 1, wherein the cells are:

a) cultured at a temperature of between 18 and 40 °C; or

b) cultured at a carbon dioxide levels of between 4 and 10 %; or

c) cultured at an oxygen level of between 10 and 35 %.

34. The reprogrammed cells of any one of claims 1-33, wherein the reprogrammed cells are for administered in a pharmaceutical composition.

35. A pharmaceutical composition comprising reprogrammed cells obtained by (i) obtaining committed cells of a first cell lineage; (ii) reprogramming the committed cells to obtain reprogrammed cells,

wherein the reprogramming comprises transdifferentiation of the committed cells to obtain transdifferentiated cells, by culturing the committed cells in a tissue culture medium comprising one or more retrodifferentiation agents and one or more differentiation promoting agents.

36. The pharmaceutical composition of claim 35, further comprising at least one pharmaceutically acceptable excipient.

37. Use of one or more reprogrammed cells in a preparation of a medicament or pharmaceutical composition for repairing or replenishing tissue or cells of a cell lineage in a patient, or for treating a disease or tissue injury,

wherein the reprogrammed cells obtained by (i) obtaining committed cells of a first cell lineage; (ii) reprogramming the committed cells to obtain reprogrammed cells,

wherein the reprogramming comprises transdifferentiation of the committed cells to obtain transdifferentiated cells, by culturing the committed cells in a tissue culture medium comprising one or more retrodifferentiation agents and one or more differentiation promoting agents.

38. A method of obtaining reprogrammed cells for administration to a patient in need thereof, wherein the method comprises (i) obtaining committed cells of a first cell lineage; and (ii) reprogramming the committed cells to obtain reprogrammed cells,

wherein the reprogramming comprises transdifferentiation of the committed cells to obtain transdifferentiated cells, by culturing the committed cells in a tissue culture medium comprising one or more retrodifferentiation agents and one or more differentiation promoting agents.

39. A method of preparing a medicament or pharmaceutical composition for administration to a patient in need thereof, wherein the method comprises: (i) obtaining committed cells of a first cell lineage; (ii) reprogramming the committed cells to obtain reprogrammed target cells; and, (iii) combining the reprogrammed target cells with one or more pharmaceutical excipients,

wherein the reprogramming comprises transdifferentiation of the committed cells to obtain transdifferentiated cells, by culturing the committed cells in a tissue culture medium comprising one or more retrodifferentiation agents and one or more differentiation promoting agents.

CLAIMS

1. Reprogrammed cells for use in replenishing tissue or cells of a cell lineage in a patient, said reprogrammed cells obtained by a method comprising (i) obtaining committed cells of a first cell lineage; and (ii) reprogramming the committed cells to obtain reprogrammed cells,

wherein the patient is suffering from a condition, disease or disorder selected from the group consisting of bone marrow failure, haematological conditions, aplastic anemia, beta-thalassemia, motor neuron disease, Parkinson's disease, spinal cord injury, muscular dystrophy, kidney disease, multiple sclerosis, congestive heart failure, hepatitis C virus, human immunodeficiency virus, head trauma, lung disease, depression, non-obstructive azoospermia, andropause, menopause, rejuvenation, scleroderma ulcers, psoriasis, wrinkles, autoimmune disease, alopecia, retinitis pigmentosa, crystalline dystrophy/blindness, diabetes, liver cirrhosis, and infertility,

wherein the reprogrammed cells are obtained by a method of retrodifferentiation and redifferentiation or transdifferentiation comprising:

(i) contacting the committed cells with one or more retrodifferentiation agents, whereby a population of retrodifferentiated cells of the patient are obtained; and

(ii) culturing the retrodifferentiated cells in a tissue culture medium comprising one or more differentiation promoting agents, whereby a population of reprogrammed cells of the patient are obtained, and

wherein the one or more differentiation promoting agents are independent of the one or more retrodifferentiation agents.

2. The reprogrammed cells of claim 1, wherein the retrodifferentiation agent engages a receptor that mediates capture, recognition or presentation of an antigen at the surface of the committed cells.

3. The reprogrammed cells of claim 1, wherein the reprogrammed cells are selected from the group consisting of pluripotent stem cells, haematopoietic stem cells, neuronal stem cells, epithelial stem cells, mesenchymal stem cells, endodermal and neuroectodermal stem cells, germ cells, extraembryonic, embryonic stem cells, kidney cells, alveolar epithelium cells, alveolar endoderm cells, neurons, ectoderm cells, islet cells, acinar

cells, oocytes, sperm, hepatocytes, keratinocytes, melanocytes, osteocytes, dermal papilla cells, chondrocytes, adipocytes, endothelium cells, cardiomyocytes, and tropoblasts.

4. The reprogrammed cells of claim 1, wherein the committed cells are obtained from whole blood, bone marrow, neuronal tissue, muscle tissue, epidermis or dermis.

5. The reprogrammed cells of claim 4, wherein the committed cells are obtained from whole blood.

6. The reprogrammed cells of claim 5, wherein the committed cells are obtained through apheresis; or wherein the committed cells are obtained from mobilized or unmobilized blood; or wherein the committed cells are selected from the group consisting of include T cells, B cells, eosinophils, basophils, neutrophils, megakaryocytes, monocytes, erythrocytes, granulocytes, mast cells, lymphocytes, leukocytes, platelets, and red blood cells.

7. The reprogrammed cells of claim 2, wherein the agent is a monoclonal antibody to the receptor.

8. The reprogrammed cells of claim 7, wherein the antibody is selected from the group consisting of monoclonal antibody CR3/43 and the monoclonal antibody TAL 1B5.

9. The reprogrammed cells of claim 1, wherein the reprogrammed cells are administered via injection or implantation.

10. The reprogrammed cells of claim 9, wherein the reprogrammed cells are administered by parenteral, intramuscular, intravenous, subcutaneous, intraocular, oral, transdermal injection, or injection into spinal fluid.

11. The reprogrammed cells of claim 1, wherein the tissue culture medium is selected from the group consisting of Iscove's Modified Dulbecco's Medium (IMDM), Dulbecco's Modified Eagle Medium (DMEM), Eagle's minimum essential (EME) medium, alpha-minimum essential medium (a-MEM), Roswell Park Memorial Institute (RPMI; site

where medium was developed) 1640, Ham-F-12, E199, MCDB, Leibovitz L-15, and Williams Medium E or any commercially available culture media.

12. The reprogrammed cells of claim 1, wherein the differentiation promoting agent is an anticoagulant, chelating agent, or antibiotic.

13. The reprogrammed cells of claim 1, wherein the differentiation promoting agent is a vitamin, or mineral.

14. The reprogrammed cells of claim 13, wherein the vitamin, or mineral, is selected from the group consisting of vitamin A, vitamin B3, vitamin C, vitamin D3, vitamin K, retinoic acid, nicotinamide, zinc or zinc compound, and calcium or calcium compounds.

15. The reprogrammed cells of claim 1, wherein the differentiation promoting agent is a natural or synthetic hormone.

16. The reprogrammed cells of claim 15, wherein the natural or synthetic hormone is hydrocortisone or dexamethasone.

17. The reprogrammed cells of claim 1, wherein the differentiation promoting agent is an amino acid.

18. The reprogrammed cells of claim 17, wherein the amino acid is selected from the group consisting of L-glutamine (L-glu), ergothioneine (EGT), praline, and non-essential amino acids (NEAA).

19. The reprogrammed cells of claim 1, wherein the differentiation promoting agent is a chemical compound.

20. The reprogrammed cells of claim 19, wherein the chemical compound is selected from the group consisting of β-mercaptoethal, dibutyl cyclic adenosine monophosphate (db-cAMP), monothioglycerol (MTG), putrescine, dimethyl sulfoxide (DMSO), hypoxanthine, adenine, forskolin, cilostamide, and 3-isobutyl-1-methylxanthine.

21. The reprogrammed cells of claim 1, wherein the differentiation promoting agent is a nucleoside.

22. The reprogrammed cells of claim 21, wherein the nucleoside is 5-azacytidine.

23. The reprogrammed cells of claim 1, wherein the differentiation promoting agent is an acids or salt thereof.

24. The reprogrammed cells of claim 23, wherein the acid or salt thereof is selected from the groups consisting of ascorbic acid, pyruvate, okadic acid, linoleic acid, ethylenediaminetetraacetic acid (EDTA), disodium EDTA, ethylene glycol tetraacetic acid (EGTA), Anticoagulant Citrate Dextrose Formula A (ACDA), sodium butyrate, and glycerophosphate.

25. The reprogrammed cells of claim 1, wherein the differentiation promoting agent is an antibiotic or drug.

26. The reprogrammed cells of claim 25, wherein the antibiotic or drug is selected from the group consisting of G418, gentamycine, Pentoxifylline (1-(5-oxohexyl)-3, 7-dimethylxanthine), and indomethacin.

27. The reprogrammed cells of claim 1, wherein the differentiation promoting agent is a protein.

28. The reprogrammed cells of claim 27, wherein the protein is tissue plasminogen activator (TPA).

29. The reprogrammed cells of claim 1, wherein the tissue culture medium contains autologous plasma, platelets, serum, or sera of mammalian origin.

30. The reprogrammed cells of claim 1, wherein the cells are cultured in blood bags, scaffolds, tissue culture bags, or plastic tissue culture vessels.

31. The reprogrammed cells of claim 30, wherein the tissue culture vessels are adherent or non-adherent tissue culture vessels; or b) wherein the tissue culture vessels are coated or uncoated.

32. The reprogrammed cells of claim 31, wherein the tissue culture vessels are coated with an agent selected from the group consisting of gelatin, collagen, matrigel, or extracellular matrix.

33. The reprogrammed cells of claim 1, wherein the cells are:

a) cultured at a temperature of between 18 and 40 °C; or

b) cultured at a carbon dioxide levels of between 4 and 10 %; or

c) cultured at an oxygen level of between 10 and 35 %.

34. The reprogrammed cells of any one of claims 1-33, wherein the reprogrammed cells are for administered in a pharmaceutical composition.

35. A pharmaceutical composition comprising reprogrammed cells obtained by (i) obtaining committed cells of a first cell lineage; (ii) reprogramming the committed cells to obtain reprogrammed cells,

wherein the reprogrammed cells are obtained by a method of retrodifferentiation and redifferentiation or transdifferentiation comprising:

(i) contacting the committed cells with one or more retrodifferentiation agents, whereby a population of retrodifferentiated cells of the patient are obtained; and

(ii) culturing the retrodifferentiated cells in a tissue culture medium comprising one or more differentiation promoting agents, whereby a population of reprogrammed cells of the patient are obtained, and

wherein the one or more differentiation promoting agents are independent of the one or more retrodifferentiation agents.

36. The pharmaceutical composition of claim 35, further comprising at least one pharmaceutically acceptable excipient.

37. Use of one or more reprogrammed cells in a preparation of a medicament or pharmaceutical composition for repairing or replenishing tissue or cells of a cell lineage in a patient, or for treating a disease or tissue injury,

wherein the reprogrammed cells obtained by (i) obtaining committed cells of a first cell lineage; (ii) reprogramming the committed cells to obtain reprogrammed cells,

wherein the reprogrammed cells are obtained by a method of retrodifferentiation and redifferentiation or transdifferentiation comprising:

(i) contacting the committed cells with one or more retrodifferentiation agents, whereby a population of retrodifferentiated cells of the patient are obtained; and

(ii) culturing the retrodifferentiated cells in a tissue culture medium comprising one or more differentiation promoting agents, whereby a population of reprogrammed cells of the patient are obtained, and

wherein the one or more differentiation promoting agents are independent of the one or more retrodifferentiation agents.

38. A method of obtaining reprogrammed cells for administration to a patient in need thereof, wherein the method comprises (i) obtaining committed cells of a first cell lineage; and (ii) reprogramming the committed cells to obtain reprogrammed cells,

wherein the reprogrammed cells are obtained by a method of retrodifferentiation and redifferentiation or transdifferentiation comprising:

(i) contacting the committed cells with one or more retrodifferentiation agents, whereby a population of retrodifferentiated cells of the patient are obtained; and

(ii) culturing the retrodifferentiated cells in a tissue culture medium comprising one or more differentiation promoting agents, whereby a population of reprogrammed cells of the patient are obtained, and

wherein the one or more differentiation promoting agents are independent of the one or more retrodifferentiation agents.

39. A method of preparing a medicament or pharmaceutical composition for administration to a patient in need thereof, wherein the method comprises: (i) obtaining committed cells of a first cell lineage; (ii) reprogramming the committed cells to obtain reprogrammed target cells; and, (iii) combining the reprogrammed target cells with one or more pharmaceutical excipients,

wherein the reprogrammed cells are obtained by a method of retrodifferentiation and redifferentiation or transdifferentiation comprising:

(i) contacting the committed cells with one or more retrodifferentiation agents, whereby a population of retrodifferentiated cells of the patient are obtained; and

(ii) culturing the retrodifferentiated cells in a tissue culture medium comprising one or more differentiation promoting agents, whereby a population of reprogrammed cells of the patient are obtained, and

wherein the one or more differentiation promoting agents are independent of the one or more retrodifferentiation agents.