

CLAIMS

1. An isolated population of chondrocyte precursor cells wherein 1% or less of the cells express Oct4, Nanog and/or TRA-1-60, 7% or less of the cells express no collagen II, collagen X, CD105 or Stro-1 and 85% or more of the cells express CBFA1
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2. An isolated population of chondrocyte precursor cells which are characterised by the loss of transdifferentiation potential.
3. A method for the preparation of chondrocyte precursor cells, comprising the steps of:
- 10 (a) differentiating a population of primate pluripotent stem (pPS) cells in chondrogenic media until the cells are greater than 75% confluent
- (b) washing the cells and resuspending in a defined minimal growth medium
- (c) culturing the cells obtained in (b) for a further period until the cells are differentiated into a population of chondrocyte precursor cells which are characterised
- 15 by the loss of transdifferentiation potential.
4. A method for the preparation of chondrocyte precursor cells, comprising the steps of:
- (a) differentiating a population of primate pluripotent stem (pPS) cells in chondrogenic media until the cells are greater than 75% confluent
- 20 (b) washing the cells and resuspending in a defined minimal growth medium
- (c) culturing the cells obtained in (b) for a further period until the cells are differentiated into a population of chondrocyte precursor cells which are characterised by 1% or less of the cells express Oct4, Nanog and/or tra-1-60, 7% or less of the cells express no collagen II, collagen X, CD105 or Stro-1 and 85% or more of the cells
- 25 express CBFA1
5. A method for the preparation of a population of isolated chondrocytes comprising the steps of:
- (a) resuspending a population of cells obtained by a method of claim 2 or claim 3 in a chondrogenic medium;
- 30 (b) culturing the cell suspension obtained in step (a).
6. An isolated population of chondrocyte precursor cells according to claim 1 or claim 2 for use in preparing chondrocyte cells for transplantation.
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7. A method of treating a degenerative cartilage disease or cartilage injury comprising transplanting a population of chondrocyte precursor cells prepared from a population of

isolated chondrocyte precursor cells according to claim 1 or claim 2 into a subject in need thereof.

5 8. A method of screening a compound for its ability to modulate chondrocyte growth, differentiation, or synthesis of cartilage components, by combining the compound with a population of chondrocyte precursor cells according to claim 1 or claim 2 and determining its effect.

10 9. A pharmaceutical composition for producing, repairing, or maintaining cartilage in vivo, containing a chondrocytes prepared from a chondrocyte precursor cell population according to claim 1 or claim 2.

15 10. A method of administering a cellular composition comprising a chondrocyte lineage cell to a subject such that the cellular composition engrafts in the subject without generating an immune response to the cellular composition that would reject the engrafted cellular composition comprising 1) obtaining a cellular composition comprising chondrocyte lineage cell and 2) administering the chondrocyte lineage cell to the subject without administering an immuno-modulatory compound to the subject.

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1. A method for preparing chondrocyte precursor cells, comprising the steps of:
 - (a) providing a culture of primate pluripotent stem (pPS) cells in chondrogenic media, wherein the pPS cells are greater than 75% confluent;
 - (b) differentiating the cells of (a) by further culturing in chondrogenic media until the cells form colonies; and
 - (c) culturing the cells obtained in (b) in de-differentiation medium that lacks factors necessary for chondrogenic differentiation, until cells de-differentiate and migrate out of the colonies, to provide a population of de-differentiated chondrocyte precursor cells, wherein the de-differentiated chondrocyte precursor cells are characterized by the loss of transdifferentiation potential to form osteoblasts when cultured in osteogenic medium.
2. The method of claim 1, wherein the population of de-differentiated chondrocyte precursor cells obtained in (c) are characterized in that 1% or less of the cells express Oct4, Nanog and tra-1-60, and 85% or more of the cells express CBFA 1.
3. The method of claim 1, wherein the pPS cells are human embryonic stem cells.

4. The method of claim 2, wherein the pPS cells are human embryonic stem cells.

5. The method of claim 1, wherein at least 25% of the population of de-differentiated chondrocyte precursor cells generated in step (c) synthesize either Type II collagen or aggrecan.

6. The method of claim 1, wherein 7% or less of the population of de-differentiated chondrocyte precursor cells generated in step (c) express no collagen II.

7. The method of claim 1, wherein 7% or less of the population of de-differentiated chondrocyte precursor cells generated in step (c) express collagen X.

8. The method of claim 1, wherein 7% or less of the population of de-differentiated chondrocyte precursor cells generated in step (c) express CD105.

9. The method of claim 1, wherein 7% or less of the population of de-differentiated chondrocyte precursor cells generated in step (c) express Stro-1.