CLAIMS:

1. A population of human polygonal retinal pigment epithelium (RPE) cells, wherein at least 95% of the cells thereof co-express premelanosome protein (PMEL17) and cellular retinaldehyde binding protein (CRALBP), wherein the trans-epithelial electrical resistance of the population of cells is greater than 100 ohms.

2. A population of human retinal pigment epithelium (RPE) cells, wherein at least 80% of the cells thereof co-express premelanosome protein (PMEL17) and cellular retinaldehyde binding protein (CRALBP) and wherein cells of the population secrete each of angiogenin, tissue inhibitor of metalloproteinase 2 (TIMP 2), soluble glycoprotein 130 (sgp130) and soluble form of the ubiquitous membrane receptor 1 for tumor necrosis factor-α (sTNF-Rl).

3. The cell population of claim 1, wherein cells of the population secrete each of angiogenin, tissue inhibitor of metalloproteinase 2 (TIMP 2), soluble glycoprotein 130 (sgp130) and soluble form of the ubiquitous membrane receptor 1 for tumor necrosis factor-α (sTNF-Rl).

4. The cell population of claims 2 or 3, wherein the cells secrete said angiogenin, said TIMP2, said sgp130 or said sTNF-Rl in a polarized manner.

5. The cell population of claim 4, wherein the ratio of apical secretion of sgp130: basal secretion of sgp130 is greater than 1.

6. The cell population of claim 4, wherein the ratio of basal secretion of angiogenin: apical secretion of angiogenin is greater than 1.

7. The cell population of claim 4, wherein the ratio of apical secretion of TIMP2: basal secretion of TIMP2 is greater than 1.

8. The cell population of claims 1 or 2, wherein the number of $Oct4^{+}TRA\text{-}1\text{-}60^{+}$ cells in the population is below 1:250,000.

9. The cell population of any one of claims 1-8, wherein

(i) at least 80% of the cells express Bestrophin 1 as measured by immunostaining;

(ii) at least 80 % of cells express Microphthalmia-associated transcription factor (MITF) as measured by immunostaining;

(iii) more than 50% of the cells express paired box gene 6 (PAX-6) as measured by FACS;

(iv) the cells secrete greater than 750 ng of Pigment epithelium-derived factor (PEDF) per ml per day, and/or

(v) the ratio of apical secretion of PEDF: basal secretion of PEDF is greater than 1.

10. The cell population of claim 2, wherein the trans-epithelial electrical resistance of the population of cells is greater than 100 ohms.

11. The cell population of any one of claims 1-10, being generated by:

(a) culturing human embryonic stem cells in a medium comprising nicotinamide so as to generate differentiating cells, wherein said medium is devoid of activin A;

(b) culturing said differentiating cells in a medium comprising nicotinamide and activin A to generate cells which are further differentiated towards the RPE lineage; and

(c) culturing said cells which are further differentiated towards the RPE lineage in a medium comprising nicotinamide, wherein said medium is devoid of activin A.

12. The cell population of claim 11, wherein steps (a)-(c) are effected under conditions wherein the atmospheric oxygen level is less than 10%.

13. A pharmaceutical composition comprising the cell population of any one of claims 1-12, as the active agent and a pharmaceutically acceptable carrier.

14. Use of the cell population of any one of claims 1-12 in the manufacture of a medicament for treating a retinal degeneration.

15. A method of generating retinal pigment epithelium (RPE) cells, comprising:

(a) culturing human embryonic stem cells (hESC) in a medium comprising a differentiating agent so as to generate differentiating cells, wherein said medium is devoid of a member of the transforming growth factor β (TGF β) superfamily;

(b) culturing said differentiating cells in a medium comprising said member of the transforming growth factor β (TGF β) superfamily and said differentiating agent to generate cells which are further differentiated towards the RPE lineage; and

(c) culturing said cells which are further differentiated towards the RPE lineage in a medium comprising a differentiating agent so as to generate RPE cells, wherein said medium is devoid of a member of the transforming growth factor β (TGF β) superfamily, wherein steps (a)-(c) are effected under conditions wherein the atmospheric oxygen level is less than 10%;

and further wherein at least 95% of the population of RPE cells generated in step (c) co-express premelanosome protein (PMEL17) and cellular retinaldehyde binding protein (CRALBP) and the trans-epithelial electrical resistance of the population of cells is greater than 100 ohms.

16. The method of claim 15, wherein step (a) comprises:

i) culturing said cultured population of human embryonic stem cells in a medium comprising nicotinamide, in the absence of activin A; under non-adherent conditions to generate a cluster of cells comprising differentiating cells; and subsequently

ii) culturing said differentiating cells of (i) in a medium comprising nicotinamide, in the absence of activin A under adherent conditions.

17. The method of claim 15, further comprising culturing said differentiated cells in a medium under conditions wherein the atmospheric oxygen level is greater than 10% in the presence of a differentiating agent following step (c).

18. The method of claim 15, wherein said member of the transforming growth factor β (TGF β) superfamily is selected from the group consisting of TGFβ1, TGFβ3 and activin A.

19. The method of claim 15, further comprising selecting polygonal cells following step (c).

20. The method of claim 16, wherein said human embryonic stem cells are propagated in a medium comprising bFGF and TGFβ.