

CLAIMS:

1. A pharmaceutical composition for treating a subject with dry-form age-related macular degeneration (AMD), the composition comprising human 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 cells is greater than 100 ohms to the subject, thereby treating the subject when the pharmaceutical composition is administered into a subretina of the subject.

2. A pharmaceutical composition for treating a subject with a retinal disease or condition, the composition comprising 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 cells is greater than 100 ohms to the subject, wherein the pharmaceutical composition comprises between 50,000 - 5,000,000 cells per administration, thereby treating the subject when the pharmaceutical composition is administered into a retina of the subject.

3. The pharmaceutical composition according to claim 2, wherein the pharmaceutical composition is administered into the retina of the subject using a device, wherein the outer diameter of the device through which the cells are administered is between 90-100 μm .

4. The pharmaceutical composition of claim 1, wherein the pharmaceutical composition comprises between 50,000- 1,000,000 cells per administration.

5. The pharmaceutical composition of claim 2, wherein the pharmaceutical composition comprises 500 cells per μl – 10,000 cells per μl .

6. The pharmaceutical composition of claim 2, wherein the retinal disease or condition is selected from the group consisting of retinitis pigmentosa, retinal detachment, retinal dysplasia, retinal atrophy, retinopathy, macular dystrophy, cone dystrophy, cone-rod dystrophy, Malattia Leventinese, Doyme honeycomb dystrophy, Sorsby's dystrophy, pattern/butterfly dystrophies, Best vitelliform dystrophy, North Carolina dystrophy, central areolar choroidal dystrophy, angioid streaks, toxic maculopathy, Stargardt disease, pathologic myopia, retinitis pigmentosa, and macular degeneration.

7. The pharmaceutical composition of claim 6, wherein the disease is age-related macular degeneration.

8. The pharmaceutical composition of claim 1, wherein the subject fulfils at least one of the criteria selected from the group consisting of:

- (i) is aged 55 or older;
 - (ii) has funduscopy findings of dry AMD with geographic atrophy in the macula, above 0.5 disc area in at least one eye;
 - (iii) is able to undergo a vitreoretinal surgical procedure under monitored anesthesia care;
- and
- (iv) does not have an immunodeficiency disease.

9. The pharmaceutical composition of claim 1, wherein the number of Oct4⁺TRA-1-60⁺ cells in a population of RPE cells is below 1:250,000.

10. The pharmaceutical composition of claim 1, wherein at least 80% of the cells express Bestrophin 1, as measured by immunostaining and/or wherein at least 80% of the cells express Microphthalmia-associated transcription factor (MITF), as measured by immunostaining and/or wherein 80% of the cells express paired box gene 6 (PAX-6) as measured by FACS.

11. The pharmaceutical composition of claim 1, wherein the cells secrete greater than 500 ng of Pigment epithelium-derived factor (PEDF) per ml per day and/or the cells secrete PEDF and vascular endothelial growth factor (VEGF) in a polarized manner.

12. The pharmaceutical composition of claim 11, wherein a ratio of apical secretion of PEDF: basal secretion of PEDF is greater than 1.

13. The pharmaceutical composition of claim 12, wherein said ratio remains greater than 1 following incubation for 8 hours at 2-8°C.

14. The pharmaceutical composition of claim 1, wherein said trans-epithelial electrical resistance of the cells remains greater than 100 ohms following incubation for 8 hours at 2-8°C.

15. The pharmaceutical composition of claim 11, wherein a ratio of basal secretion of VEGF: apical secretion of VEGF is greater than 1.

16. The pharmaceutical composition of claim 1, wherein the cells are capable of rescuing visual acuity in a RCS rat following subretinal administration.

17. The pharmaceutical composition of claim 1, wherein the cells are generated by ex-vivo differentiation of human embryonic stem cells.

18. The pharmaceutical composition of claim 1, wherein the cells are generated by:

(a) culturing human embryonic stem cells or induced pluripotent 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.

19. The pharmaceutical composition of claim 18, wherein said embryonic stem cells or induced pluripotent stem cells are propagated in a medium comprising bFGF and TGF β .