CLAIMS

1. A method for the expansion of retinal pigment epithelial (RPE) cells, the method comprising:
    a) providing a population of RPE cells, wherein the population of RPE cells was differentiated from pluripotent stem cells;
    b) inoculating a medium comprising a first suspendible cell support matrix with the population of RPE cells; and
    c) expanding the population of RPE cells on the first suspendible cell support matrix in dynamic suspension to provide an expanded population of RPE cells.

2. The method of claim 1, wherein prior to step a) the population of RPE cells was expanded on a solid surface under static conditions.

3. The method of claim 1, wherein prior to step a) the population of RPE cells was expanded on a solid surface under dynamic conditions.

4. The method of any one of claims 1 to 3, wherein the first suspendible cell support matrix comprises a microcarrier.

5. The method of claim 1, wherein the population of RPE cells is provided from an intermediate cell bank.

6. The method of any one of claims 1 to 5, wherein the first suspendible cell support matrix is uncoated.

7. The method of any one of claims 1 to 6, wherein differentiation of the population of RPE cells from pluripotent stem cells comprises:
    i. expansion of pluripotent stem cells on a solid surface under conditions that maintain pluripotency of the pluripotent stem cells to provide expanded pluripotent stem cells;
    ii. differentiating the expanded pluripotent stem cells in a medium comprising a

differentiating agent and optionally a growth factor for a period of time to provide the population of RPE cells.

8. The method of claim 7, wherein the solid surface comprises a second suspendible cell support matrix and the pluripotent stem cells are expanded in dynamic culture.

9. The method of any one of claims 7 to 8, wherein step ii comprises differentiating the expanded pluripotent stem cells on a third suspendible cell support matrix in dynamic culture.

10. The method of claim 9, wherein the expanded pluripotent stem cells from step i remain attached to the second suspendible cell support matrix in step ii.

11. The method of claim 9, wherein at least two of the first suspendible cell support matrix, second suspendible cell support matrix, and third suspendible cell support matrix are the same.

12. The method of claim 9, wherein the first suspendible cell support matrix, second suspendible cell support matrix, and third suspendible cell support matrix are different.

13. The method of any one of claims 7, wherein step ii comprises differentiating the expanded pluripotent stem cells on a culture plate in static culture.

14. The method of claim 8, wherein the pluripotent stem cells are grown into a monolayer adherent to the second suspendible cell support matrix and/or third suspendible cell support matrix.

15. The method of claim 7, wherein the conditions for maintaining pluripotency are feeder cell free.

16. The method of claim 7, wherein the conditions for maintaining pluripotency comprise a feeder cell population.

17. The method of claim 7, wherein the differentiating reagent is nicotinamide.

18. The method of claim 7, wherein the growth factor is a member of the TGFβ family.

19. The method of claim 9, wherein the first suspendible cell support matrix, second suspendible cell support matrix, and/or third suspendible cell support matrix comprises polystyrene, surface-modified polystyrene, chemically modified polystyrene, cross-linked dextran, cellulose, acrylamide, collagen, alginate, gelatin, glass, DEAE-dextran, or a combination thereof.

20. The method of claim 19, wherein the first microcarrier, second suspendible cell support matrix r, and/or third suspendible cell support matrix is spherical, ellipsoidal, rod-shaped, disc-shaped, porous, non-porous, smooth, flat, or a combination thereof.

21. The method of claim 9, wherein the first suspendible cell support matrix, second suspendible cell support matrix, and/or third suspendible cell support matrix is coated with laminin, Matrigel, collagen, poly-lysine, poly-L-lysine, poly-D-lysine, vitronectin, fibronectin, tenascin, dextran, a peptide, their derivatives, or a combination thereof.

22. The method of claim 2, wherein the solid surface is uncoated or coated with laminin, Matrigel, collagen, poly-lysine, poly-L-lysine, poly-D-lysine, vitronectin, fibronectin, tenascin, dextran, a peptide, their derivatives or a combination thereof.

23. The method of claim 1, wherein the population of RPE cells has a population doubling level between 2-4 during P0, 2-3 during P1, and 1-2 during P2 in step c).

24. The method of claim 1, wherein the population of RPE cells is seeded in the presence of 2% -20% Human serum/DMEM during P0, during P1, and during P2 in step c).

25. The method of claim 1, wherein the population of RPE cells is seeded on solid substrate in dynamic culture during P0, during P1, and during P2 in step c).

26. The method of claim 1, wherein the population of RPE cells was seeded on solid substrate in dynamic culture in cell density of 50,000 cells/cm2 -120,000 cells/cm2 during P0, during P1, and during P2 in step c).

27. The method of claim 1, wherein the population of RPE cells was seeded in dynamic culture on solid substrate with surface area of 2.5cm2 /ml -10 cm2 /ml during P0, during P1, and during P2 in step c).

28. The method of claim 1, wherein step c) comprises maintaining % dissolved oxygen above 30%.

29. The method of claim 1, wherein step c) comprises initial a growth media volume starting at 50% of total system growth chamber volume, and wherein a growth media volume of 16.6% of total system growth chamber volume is added every 2-4 days.

30. The method of claim 1, wherein the expanded population of RPE cells is characteristic of mature RPE cells.

31. The method of claim 30, wherein the mature RPE cells are double positive for cellular retinaldehyde-binding protein (CRALBP) and premelanosome protein (PMEL17) at greater than 95% as measured by flow cytometry.

32. The method of claim 31, wherein the mature RPE cells generate a polarized monolayer post thawing having net transepithelial electrical resistance (TEER) >100Ω*cm2 and polarized secretion of PEDF and VEGF.

33. The method of claim 32, wherein the mature RPE cells are cryopreserved and ready for administration to a subject upon thawing.

34. The method of claim 30, wherein the mature RPE cells comprise <0.01% pluripotent stem cells as confirmed by a high accuracy flow cytometry method (FCM), and are negative for TRA-1-60/Oct-4 as measured by flow cytometry.

35. The method of claim 2, wherein the dynamic suspension is performed in a single-use bioreactor.

36. Use of pharmaceutical composition comprising RPE cells generated by the method of

claim 1 in the manufacture of a medicament for treating a disorder or disease of the eye, wherein the treating comprises transplanting the medicament into the retinal tissue of a patient.

37. A pharmaceutical composition comprising the cells generated by the method of claim 1.