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Retinal pigment epithelial cell replacement strategies

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Dysfunction of Retinal Pigment Epithelial (RPE) cells and their underlying Bruch's basement membrane leads to subsequent photoreceptor degeneration and irreversible vision loss in several retinal pathologies including Age-related Macular Degeneration (AMD) Subretinal transplantation of a functioning monolayer of cells to replace the damaged or lost RPE cells is a promising area for treatment of AMD. Replacement of the atrophied RPE cell layer has previously shown some potential in restoring visual acuity in patch autograft surgeries. The source of replacement cells (ocular and non-ocular) from induced pluripotent cells, embryonic stem cells, mesenchymal stem cells and adult epithelial cells is the subject of widespread research with some Phase I clinical trials underway. In addition, the choice of underlying substrates for transplant being developed includes biological and artificial substrates that are either degradable or non-degradable. The merits and challenges currently faced in translating the plethora of cross-discipline discovery research into clinical practice will be presented.

Recent Publications

- 1. Kearns V R, Tasker J, Zhuola Akhtar R, Bachhuka A et. al (2017) The formation of a functional retinal pigment epithelium occurs on porous polytetrafluoroethylene substrates independently of the surface chemistry. J. Mater. Sci. Mater. Med. 28(8):124.
- 2. Parekh M, Ferrari S, Sheridan C, Kaye S and Ahmad S (2016) Concise review: an update on the culture of human corneal endothelial cells for transplantation. Stem Cells Translational Medicine. 5(2):258-264.
- 3. Branch M J Yu, W Y, Sheridan, C and Hopkinson A (2015) Isolation of Adult Stem Cell Populations from the Human Cornea. In: Rich, I. N. Stem Cell Protocols. Doi: 10.1007/978-1-4939-1785-3.
- 4. Doherty K G, Oh J S, Unsworth P, Bowfield A, Sheridan C M et. al (2013) Polystyrene surface modification for localized cell culture using a capillary dielectric barrier discharge atmospheric-pressure microplasma jet. Plasma Processes and Polymers. 10(11):978-989.
- 5. Mason S L, Stewart R M, Kearns V R, Williams R L and Sheridan C M (2011) Ocular epithelial transplantation: current uses and future potential. Regen Med. 6(6):767-782.

Biography

M Sheridan is an internationally renowned Cell Biologist with research experience in Ocular Cell Biology since 1991. His areas of focus have centered on ocular wound healing and cell transplantation research with published papers concerning the ocular surface, cornea, outflow pathway as well as retinal pathologies such as proliferative vitroretinopathy (PVR) and age-related macular degeneration (AMD). He has published and reviewed for almost all Ophthalmology scientific journals as well as chaired at international Ophthalmology conferences. He has a keen interest in both Tissue Engineering and Regenerative Medicine approaches to prevent and restore sight loss and is passionate that cross discipline research is key to achieving this goal.

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