Retinal Pigment Epithelium Derived Stem Cells

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Retinal pigment epithelial (RPE) stem cells offer a theoretical treatment strategy for a wide variety of retinal disorders including age-related macular degeneration (AMD) and retinal dystrophies. There are, however, a number of hurdles that will have to be overcome before a consistently reliable and successful therapy can be offered to patients. These include expansion of sufficient numbers of suitably differentiated cells for transplantation, technical issues around insertion of the cells and removal of damaged tissue (such as abnormal Bruch's membrane in AMD), immunological rejection of transplanted cells, and control of post-transplant cell differentiation.[1-3] Thus, in the case of RPE cell replacement, it may ultimately be proven that transplantation of an expanded number of differentiated cells on a porous substrate can deal with issues such as control of differentiation, prevention of proliferative vitreoretinopathy and replacement of damaged Bruch's membrane.[3]

In this issue, Akrami and colleagues document their method of obtaining spheroid colonies from cadaveric donors.[4] This method is a step toward providing a source of retinal cells for transplantation. Interestingly, the cells in the cultures expressed stem cell markers, RPE cell markers and/or the morphological features of neural/photoreceptor cells. However, whether these cells can function as RPE or neural/photoreceptor cells is yet unknown. The authors also noted that the number of free floating spheroids could be increased by culturing the cells in serum-free conditions, a situation that may deprive them of attachment factors.[5] Whatever the mechanism for the increase in spheroids, this method yields promise for expansion of sufficient numbers of cells for transplant purposes in the treatment of retinal diseases.

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