Introduction

The Retinal Pigment Epithelium (RPE) is a mono-layer of cuboidal epithelial cells separating the photoreceptors from their choroidal blood supply and arranged in regular hexagonal pattern. The RPE cell density is approximately 5000 cells /mm^2 in the fovea & about 2000 cells/ mm^2 in the periphery ***(Harman et al., 1997).*** Each RPE cell faces 30 to 40 photoreceptors with its choroidal side resides on Bruch's membrane while its retinal side faces the subretinal space ***(La Cour, 2003).*** The RPE produces a number of cytokines, including basic fibroblast growth factors (BFGF) ***(Campochiaro, 1998).***

Photoreceptor cells are highly specialized cells converting light to nerve signals in a process called phototransduction. Two main types of photoreceptors are known namely rod cells and cone cells. All human rods contain the same rhodopsin, but cones contain three different opsins sensitive to three different regions of the light spectrum ***(Curcio et al., 1990).***

Both photoreceptors and choriocapillaries depend on the RPE for their survival as it participates in photoreceptors' outer segment renewal as well as storage and metabolism of vitamin A. So, if the RPE is destroyed by chemical or mechanical means, the photoreceptors & the choriocapillaries will be atrophied ***(Campochiaro, 1998).***

Retinal pigment epithelium (RPE) and retinal cell transplantation aim to restore the subretinal anatomy and re-establishing the critical interaction between the RPE & photoreceptors, which is fundamental to sight ***(da Cruz et al., 2007).*** Retinal transplants have been used in surgically induced retinal lesion ***(Rauer and Ghosh, 2001)*** and in primary RPE dystrophies, age related macular degeneration

(AMD), retinitis pigmentosa and allied diseases ***(da Cruz et al., 2007).***

The retinal pigment epithelium arises from neuroectoderm. Also, it can be derived from human embryonic stem cells which are an important source of RPE for transplantation ***(Klimanskaya, 2006)*** in which grafts from donors of the same species (Allogenic grafts) or from different species (Xenogenic grafts) can be implanted in the host through vitreous cavity into the subretinal space with or without host imminent suppression ***(Rauer and Ghosh, 2001).***

Extensive researches have led to the identification of several obstacles to success in graft integration within the host (in case of photoreceptors transplantation), graft survival, differentiation & immune rejection (in case of RPE cells transplantation). The unique anatomy of the eye including the laminar organization of retinal neurons combined with straight forward surgical access to the subretinal space augur well for the ultimate success of these efforts ***(Khodair et al., 2006).***