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Cultivation and Characterization of Human Lacrimal Gland Cells for Potential Clinical Application

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Purpose: Xerophthalmia is one of the morbid complications following radiotherapy to the tumors of head and neck. Due to limited benefits of conventional medical treatment for radiation induced-dry eyes, options like cell based therapy are being evaluated. We herein present the data on in-vitro culture and characterization of lacrimal gland cells for potential clinical application.

Methods: After IRB approval and informed consent, fresh lacrimal gland samples were obtained from patients undergoing exenteration. All the tissues were histologically confirmed as normal and free of tumor. Cultures were established using appropriate enzyme cocktail, substrate and medium. The cells were characterized by immunocytochemistry for epithelial markers (E-cadherin, CK3/12) and mesenchymal markers (CD90, vimentin). In-vitro function of these acinar cells was evaluated by ELISA by testing for Ig A levels.

Results: Successful cultures were established from all the samples of human lacrimal gland tissues- both as a monolayer as well as spheres. The epithelial cells were polygonal, with distinct cell borders and secretory granules and were immunoreactive for ABCG2, CK 3/12, connexin and E-cadherin. The 3 D spheres formed in serum free medium, while monolayered epithelial cells were seen on denuded human amniotic membrane and ECM coated dishes. The conditioned media of the lacrimal tissues showed the presence of secretory IgA. In addition, the cultures also showed adherent spindle cells that were positive for CD 90 and vimentin. The epithelial cells were short lived (20-30 days) while the spindle cell survived for 3-4 months, especially in serum containing medium.

Conclusions: Successful 2 and 3 dimensional cultures were established from fresh human lacrimal gland tissues with preserved secretory function. The presence of spindle cells is an intriguing finding which could represent a stromal origin and warrants further studies.

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Oral Epithelial Cells Transplanted on to Corneal Surface Tend to Adapt to the Ocular Phenotype

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Purpose: To understand the response of oral epithelial cells transplanted on corneal surface to the ocular cues in vivo.

Methods: The corneal button obtained after penetrating keratoplasty (PK) of an eye of a patient with total limbal stem cell deficiency (LSCD) previously treated with cultured oral