ABSTRACT BS-14

Evaluation of Human Lacrimal Gland Cultures for Secretory Function and Putative Stem Cells

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Purpose: Dry eye syndrome is a chronic disabling disease caused by functional disruptions in the lacrimal gland. The current treatment involves palliative ocular surface lubrication and rehydration. Cell therapy involving replacement of the gland is a promising alternative for long-term relief to patients. This study aimed to establish functionally competent human lacrimal gland cultures *in–vitro* and explore the presence of stem cells in the native gland and established cultures.
Methods: Fresh human lacrimal gland from patients undergoing exenteration was harvested after IRB approval. The freshly isolated cells were evaluated for expression of stem cell markers ABCG2, high ALDH1 levels and c-kit. Cultures were established on Matrigel, collagen and HAM and these investigated for the presence of stem cell markers and differentiating markers of epithelial (E-cadherin, EpCAM), mesenchymal (Vimentin, CD90) and myoepithelial (α-SMA, S-100) origin. The conditioned media was tested for secretory proteins (scIgA, lactoferrin, lysozyme) by ELISA.
Results: Native human lacrimal gland on flow cytometric analysis showed the expression of ABCG2, high ALDH1 and c-kit. Lacrimal gland cultures formed a monolayer, in order of preference on Matrigel, collagen and HAM within 15-20 days, containing a heterogeneous population of stem-like and differentiated cells. The epithelial cells formed 'spherules' with duct-like connections. The levels of secretory proteins in the conditioned media were significantly higher than the negative controls ($p < 0.05$ for all comparisons) indicating ongoing differentiation.
Conclusions: The study reports the novel finding of establishing functionally competent human lacrimal gland cultures *in-vitro*. It also provides preliminary data on the presence of potential stem and duct-like cells in the fresh and *in-vitro* cultured human lacrimal gland, which warrant further studies. These significant findings could pave way for cell therapy in future.