Journal of Stem Cells & Regenerative Medicine
An exclusive & FREE online journal
www.pubstemcell.com JSRM/Vol4 No.1, 2008; p18-19

Proceedings of the Annual Symposium on Regenerative Medicine(PASRM)

Buccal Epithelium in treating Ocular Surface Disorders

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Published online on 14 Nov 2008

Background:

Ocular surface disorders due to limbal stem cell deficiency are an important cause of ocular morbidity and visual loss. Although autologous limbal stem cell transplants have helped in the management of unilateral disease, allografts in those with bilateral disease often fail due to immunological reasons. The use of autologous buccal epithelium cultivated on amniotic membrane has been described as a useful approach in the management of this condition. It is the purpose of this study to explore the feasibility of using a novel thermo-gelatin polymer (TGP) as a substrate to culture these cells, and to characterize them using RNA extraction and RT-PCR.

Methods:

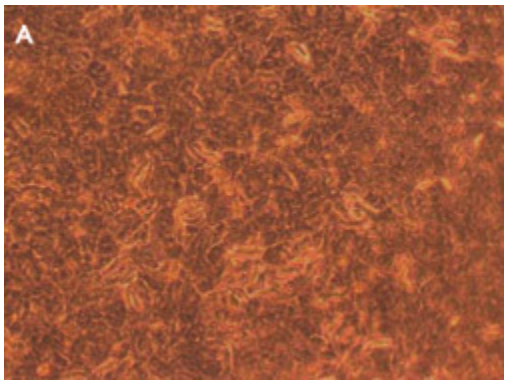
Oral cheek mucosal biopsies were obtained from 5 adult patients undergoing Modified Osteo-Odonto Keratoprosthesis surgery. The specimens were transported to the laboratory in transport medium. The cells were released using enzymatic digestion and seeded in both convention culture medium and TGP. The resulting cellular growth was characterized using RNA extraction and RT-PCR.

Results:

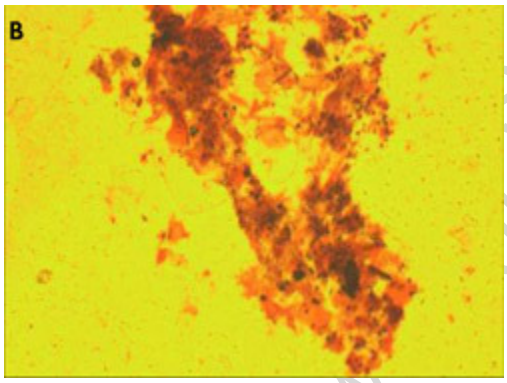
Cells could be cultured from 4 of the 5 specimens. In one specimen, contamination occurred and this was discarded. In the other specimens, the cheek epithelial cells could be cultured in both the conventional culture medium and TGP, with equal ease. RT-PCR revealed the presence of K3, a marker for epithelial cells, and GAPDH indicating the presence of some adipose tissue as well.

Cover Images:

A : Buccal mucosal epithelial cells in culture on the 28th day in novel TGP synthtic scaffold



B: Histopathological examination and H&E staining of the cells grown in the method as shown above in Picture A



Conclusions:

It is possible to culture autologous cheek mucosal epithelial cells using TGP, a synthetic scaffold, without the need for other biological substrates. Since the specimens are obtained from the oral cavity, stringent asepsis is required. Further studies are required for histopathological characterization of the cultured cells and to create a model for delivery onto the ocular surface of eyes with bilateral surface disease due to limbal stem cell deficiency.

JSRM/004010700009/Nov 14, 2008.