Importance of Cell Interactions in Tissue Engineering of Full-thickness Oral Mucosa
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Introduction
Tissue engineered oral mucosa may be applied to tissue deficits due to facial trauma, malignant lesion surgery or preprosthetic procedures. It can also be used to study the biology of oral mucosa, and as an alternative model to testing in vivo [1]. The aim of the present study was to reconstruct a full-thickness human oral mucosal equivalent (OME) comprising both an epithelium and an underlying lamina propria. The influence of the fibroblast-epithelial cell interactions on epithelial development was also investigated by culturing oral epithelial cells on both lamina propria equivalents (LPE) and stromal equivalents (SE).

Materials and Methods
A porous collagen-glycosaminoglycan-chitosan (CGC) scaffold [2] was seeded first with human oral fibroblasts giving rise to an LPE, and then with human oral epithelial cells resulting in a full thickness oral mucosal equivalent. The SE was reconstructed by seeding human corneal keratocytes in the porous CGC scaffold.

Results
Results of the histology, immunofluorescence and transmission electron microscopy (TEM) demonstrated the presence of a nonkeratinizing pluristratified epithelium as in native human oral mucosa, expressing the major differentiation marker keratin 13 (K13). This epithelium was firmly anchored to the LPE by a continuous and ultrastructurally well organized basement membrane. In the LPE, fibroblasts synthesized new extracellular matrix. The epithelium formed on lamina propria equivalents was thick (9-10 layers) resembling the native oral mucosa. When the same oral epithelial cells were seeded on stromal equivalents, the resulting epithelium was thin (1-2 layers) as in native cornea. K13 was expressed strongly in both cases, independently of the underlying mesenchymal tissue or the epithelial layer thickness.

Discussion and Conclusions
In this study it was possible to reproduce a full-thickness human oral mucosa in which fibroblasts and epithelial cells interact as shown by the thick epithelium on LPE and the thin one on SE.

References

Disclosures
Authors have nothing to disclose.