

The Effects of Fibroblasts on the Growth and Differentiation of Human Bulbar Conjunctival Epithelial Cells an In Vitro conjunctival Equivalen

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摘要

Abstract

PURPOSE: To study the effects of collagen matrix and fibroblasts on the growth and development of human bulbar conjunctival epithelial cells.

METHOD: Human bulbar conjunctival epithelial cells were cultured on three-dimensional collagen gels containing either normal human conjunctival fibroblasts (HCF), Swiss 3T3 cells, or no cells. After 1 week of culturing, half of the cultures were raised to the air-liquid interface and the rest of the cultures remained submerged. On day 14, cultures were fixed and sectioned for light and electron microscopic studies.

RESULTS: Conjunctival epithelial cells cultured on fibroblast-contracted collagen lattice developed into a multicell-layer epithelium with characteristic epithelial structural features including microvilli, desmosomes, early hemidesmosomes, and basement membrane-like structures. Formation of all or some of the above features appeared to be influenced by the type of fibroblasts in the collagen lattices. Structures such as hemidesmosomes and basement membrane were only observed in epithelium developed on 3T3- but not on conjunctival fibroblast-condensed collagen lattices. In contrast, goblet cell differentiation was only observed in epithelia developed on normal HCF-supported collagen matrix. Epithelial cells cultured on acellular collagen gels did not develop into multicell-layer epithelium, and no differentiated characteristics were observed.

CONCLUSIONS: These results indicate that the type of fibroblasts dispersed in the collagen matrix plays an important role in the development and differentiation of conjunctival epithelial cells. Normal HCF-dispersed collagen matrix was less growth stimulating to epithelial cells and allowed them to

undergo goblet cell differentiation. In contrast, 3T3-dispersed collagen matrix was more growth stimulating, resulting in thicker epithelium with a higher degree of stratification.