MatTek CORPORATION

TITLE:

Healing of Dermal Burn Wounds in the EpiDerm-FT In Vitro Human Skin Model

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ABSTRACT:

Purpose: Dermal wound healing involves interactions between dermal fibroblasts and epidermal keratinocytes, as well as cell and extracellular matrix interactions. The current poster describes wound healing experiments conducted with a full-thickness in vitro human skin model (EpiDerm-FT). An in vitro skin model would be useful to develop and test new dermatologics designed to promote wound healing.

Methods: Normal human epidermal keratinocytes (KC) and dermal fibroblasts (FB) were cultured to produce the highly differentiated full-thickness skin model. Histological examination of EpiDerm-FT shows a collagen dermis populated by viable FB and an epidermis of stratified KC including basal, spinous, granular and stratum corneum components. Small burn wounds of several mm in diameter were induced in the epithelial model by means of a battery operated cauterizer. The wounded EpiDerm-FT cultures were fixed at various time points and H&E stained paraffin sections were prepared to evaluate the wound and the wound healing process.

Results: Immediately after burn wounding, necrotic epithelium and denatured collagen dermal matrix were evident. Within one day, the denatured collagen matrix began to degrade and epithelial KC were observed migrating inward from the wound edges. Over a time course of seven days, migrating KC repopulated the wounded area to form a fully covered epithelium. Dermal fibroblasts were also observed to be proliferating within the wound area and generating new dermal matrix material.

Conclusions: These results demonstrate that the EpiDerm-FT model will likely prove useful for applications designed to elucidate dermal-epidermal interactions during wound healing and to evaluate the role of specific growth factors or new therapeutics in the dermal wound healing process.

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