

To Develop an *in vitro* (EFT-300) Skin Model for Wound Healing Studies.

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Introduction: Wound healing is a natural process, which involves the regeneration of epidermal and dermal tissue.

Objective: The objective of the present study was to evaluate the epiderm full thickness (EFT-300) skin culture as an in-vitro wound healing model.

Methods: In the present study, a strong base KOH, strong acids H₂SO₄ and acrylic acid were selected for making a significant wound. Dose was optimized. Immediately after the treatment, cultures were washed thoroughly with distilled water in case of KOH, or strong base such as phosphate buffer saline of pH 8 in case of H₂SO₄ and acrylic acid. Later, cultures were incubated at 37°C. After the subsequent time point culture medium, skins were collected every alternate day until six days for histological studies, cytokines, chemokines and presence of growth factors in culture medium.

Results: Histological sections of 32N KOH (4μl for 3 minutes) at 0hr clearly showed damage to stratum corneum and upper layers of epidermis and no damage to dermis. However concentrated H₂SO₄ (2μl for 1 minute) showed deeper wound in epidermis without significant damage to the stratum corneum. Acrylic acid (5μl for 3 minutes) only damaged the dermis sparing stratum corneum and epidermis. In the culture medium, both 32N KOH and concentrated H₂SO₄ treatment resulted in significant release of IL-6 and IL-8 compared to control, but as the time progressed there was a decline in the biomarkers release. Further, growth factors EGF (32N KOH and conc H₂SO₄) and FGF (acrylic acid) levels in the skin were increased followed by increase in levels of GMCSF in the culture medium.

Conclusions: Histological studies clearly showed that there was a regeneration of keratinocytes in epidermal layers when treated with 32N KOH and concentrated H₂SO₄ and regeneration of fibroblasts, collagen in the dermis when treated with acrylic acid. The up regulation of several skin growth factors also support that the wound is healing by itself following treatment with corrosive chemicals. Hence, these results strongly support that the EFT-300 cultures could be a good in-vitro model for studying wound healing process.

To be presented at the Society of Toxicology (SOT) Annual Meeting, March 15-19, 2009 in Baltimore, MD (USA)

ID# 1836 Poster Board 424

Location: Exhibit Hall

Time of Presentation: Mar 18 1:00PM