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Response of artificial human skin to irritants: cytokine and prostaglandin release

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ABSTRACT

Cytokines have been implicated in aspects of vesicant injury/repair. This study describes responses of artificial human skin (Skin^2 and EpiDerm) to chloroethyl ethyl sulfide (CEES), defined by interleukin-1α (IL-1α), tumor necrosis factor-α (TNF-α) and prostaglandin E_2 (PGE_2) release. Skin^2 and EpiDerm in Millicells of 6 well Costar trays containing 1ml of assay media/well were exposed to CEES (2.0mg/L, flow rate 1L/min for 2hr) in humidified air. Control tissues were exposed without CEES. Millicells containing Skin^2 or EpiDerm (12/group) were transferred to fresh assay media and incubated for 22 hr. Tissues (6/group) were used for MTT tests. Media from each well were stored in liquid N_2. IL-1α (RIA or ELISA), PGE_2 (RIA or EIA), and TNF-α (EIA) were measured in thawed specimens. CEES significantly increased release of IL-1α (192pg/ml ± 34.9, control 55pg/ml ± 16.6) and PGE_2 (3,977pg/0.1ml ± 1,197, control 2,541pg/0.1ml ± 570) from Skin^2, but not TNF-α levels, with viability (MTT) 3%. Neither IL-1α nor TNF-α were elevated by CEES-exposed EpiDerm, although PGE_2 was elevated (258pg/0.1ml ± 71 vs 184 ± 79), viability 46%. We conclude pro-inflammatory mediators, IL-1α and PGE_2, could play significant roles in CEES injury and that either fibroblasts are critical to the process, or EpiDerm, which lacks fibroblasts, is somehow more resistant.

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