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Innovative *in vitro* 3D skin model for safety assessment: a case report for the skin sensitization

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Abstract

Prevalence of allergic contact dermatitis is increasing, justifying the need to assess skin sensitization potential for any chemical products. Current assessments of potential sensitization events of new compounds are performed according to three guidelines (OECD 442 C, D and E) and a battery of *in vitro* tests. Despite the advances of skin model equivalents (SME) validated by the governmental organizations, none of them consider the interplay between the epidermis/dermis cells and the resident immune cells. The aim of our study was to develop a SME that includes an endothelial barrier and some relevant resident immune cells involved in the skin sensitization cascade.

The model integrated adult Normal Human Epidermal Keratinocytes, Normal Human Dermal Fibroblasts, Human Umbilical Vein Endothelial cells, THP-1 (a human leukemia monocytic cell line), and THP-1 derived macrophages. Structure, cells and tissue-specific markers were revealed by immunocytochemistry techniques.

Our approach resulted in a multilayered, differentiated epidermis proliferating on top of the dermis as revealed by immunolabelling analyses. Presence of specific markers of human epidermis/de rmis as well as presence/activation of immune resident cell phenotype was verified using immune labelling techniques.

This 3D skin model should allow in future to obtain more translatable indications regarding possible inflammatory events induced by drugs and medical devices.

Keywords

3D skin model; immunity; pseudo-vascularization; skin sensitization; cosmetic product safety