WOUND HEALING

EPIDERMAL IN VITRO MODEL WITH IMPAIRED BARRIER FUNCTION TO ASSESS SKIN IRRITATION POTENTIAL

L. Ceriotti [(1)] *- S. Balzaretti* [(1)] *- M. Meloni* [(1)]

Vitroscreen, In Vitro Research Laboratory, Milan, Italy [(1)]

Introduction: In vitro reconstructed human epidermis (RHE) models are recognized as sensitive and reliable models to replace or reduce animal use in preclinical studies. Due to their commercial availability and standardized tissue features, they represent a suitable system to produce reproducible models with controlled skin barrier functions.

Objective: On a reproducible RHE model, the objective of this study was to develop and characterize a model with impaired barrier function to be used to assess the irritation potential of dermo-pharmaceutical products and medical devices intended to be applied on injured skin (Class IIb).

Materials & Methods: The RHE surface (0.5 cm2, 17 days differentiation) was mechanically abraded targeting the outermost layer of the physical barrier without involving deeper epidermal structures. After injury and 24h exposure to test items and relevant positive and negative controls a multiple endpoint analysis (MEA) approach has been adopted to assess barrier modification at physical and morphological level by quantifying the following parameters: MTT for cytotoxicity quantification, In Vitro Transepidermal Water Loss (TEWL), Trans-Epithelial-Electrical-Resistance (TEER) histo-morphological analysis (H&E), biotin staining to appreciate Tights Junctions (TJs) efficiency and caffeine permeability assay to assess tissue permeability modifications and recovery kinetics after abrasion.

Results: The results have shown that the lesional RHE is characterized by a transient increased permeability to caffeine during the first 3h, a stable impairment of TJs as measured by biotin assay associated with modified SC lamellar structure, TEER reduction and TEWL increase while cell viability has not been significantly affected.

Conclusions: The injured RHE model represents a sensitive and predictive tool to assess skin tolerance of topically applied ingredients and products, optimize formulation composition at developmental stage and early identify toxicity mechanisms that correlate with infra-clinical reactions.