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Skin on a chip based alternatives to animal testing for categorizing irritant chemicals and non-irritant chemicals

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In vivo animal testing was necessary for the evaluation of skin irritation and corrosion (OECD TG 404). With the increasing need of non-animal tests to predict acute skin irritation of chemicals, many *in vitro* alternative tests have been developed and recommended to be used for discriminating between irritant chemicals and non-irritant chemicals. In the present study, emerging organ on a chip technology was employed to develop reconstructed human skin on a chip which closely mimics the properties of the human skin, including the epidermis, dermis and blood vessels. The skin on a chip consists of top, middle and bottom layers representing the epidermis, dermis and blood vessels, respectively. The membrane between the top and middle layer in the skin on a chip was used to compare the results from the reconstructed human epidermis (RhE) by applying the chemicals and measuring the cell viability. More importantly, the membrane between the middle and bottom layer was used to observe the tight junction's presence, using the confocal microscopy. Chemicals that were previously determined as irritant or non-irritant, according to OECD TG 439 and animal testing, were applied to the skin on a chip and the classification of irritants by measuring viability exhibited the same categorization of irritant and non-irritant chemicals. In addition, the absence of tight junction when irritant chemicals were applied was observed. These results suggest that the skin on a chip system can be used to predict skin irritating ability of chemicals as an *in vitro* skin irritation assay.

Biography

Tae Hyun Choi has completed his PhD from Keimyung University School of Medicine, South Korea. He is currently working as an Assistant Professor and a Doctor in Seoul National University School of Medicine. He has published more than 95 papers in reputed journals and has been serving as an Editorial Board Member of repute.

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