Development of Artificial Epidermis for Personalized Allergy Tester through Cultivation of Collagen Film and Keratinocyte Cell Line

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Tissue engineering is a research field for regenerating damaged biological tissue by substituting human cells on an appropriate scaffolds, one of them collagen as a biodegradable polymer has been widely used. Artificial skin is primarily used for regenerate damaged skin caused by severe burns, skin damage and dermatology, but has rarely been used for allergic testing. In this study, we suggested an alternate way for allergy testing via cultivating the patient's epidermal cell on top of an artificial collagen film, ultimately reducing the effort and the danger over direct in vivo testing on the patient. By cultivating Human Keratinocyte Cell Line on an artificial collagen film and applying allergens, PBS and ethanol extracts of peanut and peach-hair, to draw out an allergic reaction, then was observed for any reactions in the allergic reaction-related genes, such as TNF-alpha, IL-1 alpha, IL-1 beta. After applying the allergens on the artificial epidermis for 24 hours, the Keratinocyte cells and the monocyte cells were harvested to be observed. For the peach hair, both TNF-alpha and IL-1 beta were observed having a strong expression in both extracts of each cells. On the other hand, for the peanut extract, only the PBS extract elicited an increase of the reaction in the TNF-alpha, IL-1 beta. Therefore, as discerning an allergic reaction from a cultivated epidermal cell on top of a collagen film was possible, an allergic reaction for a patient using his or her epidermal cell was also possible.

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