

〈原 著〉

ヒト角層に存在する内在性 cathepsin D-like および chymotrypsin-like proteinase による落屑の調節

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Regulation of Human Stratum Corneum Desquamation by Endogenous Cathepsin D-Like and Chymotrypsin-Like Proteinases

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Abstract

The stratum corneum, the outermost skin cell layer, functions as the main defense against physical and external chemical stress, and as a barrier to prevent epidermal water loss. Desquamation is the final event of epidermal differentiation, in which the desmosomes, which tightly bind the corneocytes to each other, are degraded by proteolysis. Desquamation has been reported to be mediated by an endogenous chymotrypsin-like proteinase. We have recently demonstrated that, in addition to the chymotrypsin-like proteinase, a cathepsin D-like proteinase was involved in the desquamation of palmo-plantar stratum corneum (*Br. J. Dermatol.*, 141: 453-459, 1999). In this study, we investigated whether a similar mechanism for desquamation is operative in the non-palmo-plantar stratum corneum that covers most of the human skin surface, and whether the enzymatic activities vary at different sites of the skin. Non-palmo-plantar stratum corneum sheets were obtained from stratum corneum which spontaneously peeled 7-10 days after sunburn. *In vitro* desquamation was evaluated by counting the number of cells released after a 3 day's incubation of stratum corneum in a detergent-containing buffer (pH 5). The desquamation was markedly suppressed when both the cathepsin D-like and chymotrypsin-like proteinases were simultaneously inhibited by specific protease inhibitors. A novel method was developed, using the insulin B chain as substrate, for the measurement of proteinase activities on the surface of human stratum corneum. No difference in chymotrypsin-like proteinase activity was observed between the forearm and the forehead. On the other hand, the cathepsin D-like proteinase activity was found to be significantly higher on the forehead than on the forearm. These results suggest the involvement of both the cathepsin D-like and chymotrypsin-like proteinases in the desquamation of human non-palmo-plantar stratum corneum and, considering that the outer stratum corneum has an acidic pH, the presumption that the cathepsin D-like activity is rate-limiting in desquamation.

Key words: cathepsin D, chymotrypsin, epidermal desquamation, proteinases, stratum corneum.