

〈シンポジウム 21世紀へ向けた角層研究の幕開け〉

(角層研究の最前線)

角層落屑に関与するプロテアーゼ

堀越 俊雄*

Proteinases Involved in Desquamation of Human Stratum Corneum

Toshio HORIKOSHI*

Abstract

The epidermis is in a continual process of cell replacement. The loss of the outer squames from the stratum corneum is defined as desquamation and balanced by mitosis of the cells in the basal cell layer. Stratum corneum squames are tightly bound to one another through desmosomal molecules and through other cohesive forces provided by endogenous proteins, lipids and lectins. Disorder of desquamation process causes several kinds of skin troubles such as a scaly and flaky surface in dry skin and skin diseases, and a thickened stratum corneum in aged skin. Our group recently has found the involvement of cathepsin D proteinase in the desquamation. In this review, desquamation mechanism including endogenous proteinases was summarized. The desmosomal protein is degraded by two endogenous proteinases, cathepsin D and stratum corneum chymotryptic enzyme (SCCE). These proteinases are produced in granular layer of epidermis and transported into intercellular space of stratum corneum. In the lowermost stratum corneum, the activity of these proteinases are suppressed by tightly packed intercellular lipid, while they begin to degrade desmosomal cohesion accompanied with modification of lipid structure in the outermost layer. The pH gradation exists within stratum corneum; neutral at lowermost, acidic at outermost layer. This pH gradation is considered to contribute the regulation of proteinase activities, because the activities are enhanced at acidic pH compared with that at neutral pH. Humidity also affects the degradation speed via increase in water content of stratum corneum. In aged skin and psoriatic epidermis, a decrease in cathepsin D activity has been reported. The detail desquamation mechanism is even now under the investigation and we hope its progress be useful for well-understanding cosmetic-skin interaction.

Key words: stratum corneum, desquamation, cathepsin D, chymotrypsin, proteinase.