

〈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)

皮膚角層ケラチン蛋白質の状態と物性

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The States and Characteristics of Stratum Corneum Keratin Protein

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Abstract

The cell of the stratum corneum, the outer layer of human skin, consists of keratin (52%) and water soluble substances like amino acids (42%). Keratin forms fibrous substructure called the 10 nm filament, which is the key structure in supporting the cell physically. So far, reports have been made on macroscopic analysis of the characteristic of stratum corneum and its mechanical characteristic correlated with low molecular weight compounds like amino acids, or on morphological investigation of the 10 nm filament, but studies of correlation from skin conditions through to molecular level of the 10 nm filament, especially how its state effects the skin condition, has not been yet reported. We analyzed the molecular behavior of the 10 nm filament and revealed the relationship between microscopic structure of 10 nm filament and macroscopic condition of stratum corneum. Experimentally, 10 nm filaments were reproduced *in vitro* from extracted and purified keratin of pig skin. The reproduced 10 nm filaments were treated with different concentrations of NMF (natural moisturizing factor) solution. We succeeded in reconstructing the same formations of 10 nm filaments as observed in healthy skin and rough skin. Structures of 10 nm filament were dependent on the concentration of amino acid. The function of stratum corneum was observed to be highly dependent on the structure of 10 nm filaments. We found that it is necessary to maintain a well-dispersed condition of the 10 nm filament under hydrophilic circumstances to maintain or restore the good condition of stratum corneum. Through these findings, we would like to propose a new evolution in skin care technology.

Key words: skin function, stratum corneum, keratin, 10 nm filament.