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タイトジャンクションと皮膚のバリア機能

古瀬 幹夫

The Role of Tight Junctions in the Epidermal Barrier Function

Mikio FURUSE

Abstract

The epithelial barrier is fundamental to the physiology of most metazoan organ systems. Tight junctions (TJs) contribute to the epithelial barrier function by restricting free diffusion of solutes through the paracellular pathway. The identification and characterization of claudins, which are tight junction-associated adhesion molecules, gives insights into the molecular architecture of tight junctions and their barrier-forming mechanism. Although it has been widely believed for a long time that there are only fragmental and non-functional TJs in mammalian epidermis, recent close inspection identified continuous TJs in the stratum granulosum, where at least claudin-1 and -4 are expressed. Indeed, claudin-1-deficient mice died within 1 day of birth with remarkable dehydration from the skin. Interestingly, in wild type epidermis, TJs prevented the diffusion of subcutaneously injected tracer toward the skin surface, whereas in claudin-1-deficient epidermis the tracer appeared to pass through TJs. These observations indicate that TJs in the stratum granulosum are crucial for the barrier function of the mammalian skin against water loss.

Key words: tight junctions, claudin, epidermal barrier, TEWL, stratum granulosum.