

## **Roles of aquaporin-3 in epidermis**

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Aquaporin-3 (AQP3) is a membrane transporter of water and glycerol expressed in plasma membranes in the basal layer keratinocytes of epidermis in normal skin. AQP3 expression in human skin is increased in response to skin stress in diseases such as atopic eczema, to various agents such as retinoic acid, and in skin carcinomas. AQP3 knockout mice have reduced stratum corneum water content and elasticity compared to wildtype mice, as well as impaired wound healing and epidermal biosynthesis. Reduced AQP3-dependent glycerol transport in AQP3-deficient epidermis appears to be responsible for these phenotype findings, as evidenced by reduced glycerol content in epidermis and stratum corneum in AQP3 knockout mice, and correction of the phenotype abnormalities by glycerol replacement. Recent data implicate AQP3 as an important determinant in epidermal proliferation and skin tumorigenesis, in which AQP3 knockout mice are resistant to tumor formation by a mechanism that may involve reduced cell glycerol content and ATP energy for biosynthesis. AQP3 is thus a key player in epidermal biology and thus a potential target for drug development.