

Identification of physiological roles of epidermal basement membrane zone proteins on skin aging

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In skin, epidermal basement membrane zone (BMZ) is served as niche for epidermal stem cells and involves in regulating cell homeostasis. Type XVII collagen (COL17) is a hemidesmosomal protein located at the epidermal BMZ. COL17 deficiency in mice and human exhibits early aged phenotype as gray hair and hair loss. In that context, COL17 has been known to engage in maintaining melanocyte stem cells and hair follicle stem cells. However, the role of COL17 in regulating stem cells in interfollicular epidermis has not been elucidated. Here we show that COL17 distribution in epidermal basal cells is altered with aging and this change also induces epidermal proliferation. Notably, overexpression of human COL17 in aged mice epidermis restores COL17 distribution and epidermal quiescence. These findings demonstrate that COL17 is crucial for maintaining epidermal homeostasis. Our study implicates that faulty epidermal BMZ is involved in uncontrolled cell proliferation, phenocopying aged skin and oncogenesis.