

Role of the regionally specialized basement membrane in the interdependence between skin sensory nerves and hair follicle stem cells

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Accurate sensory perception requires the precise targeting and structure of sensory nerve endings and specialized non-neural end cells. However, the mechanisms that regulate the sensory terminal architecture remain poorly understood. We demonstrated that an extracellular matrix protein, EGFL6, which is localized in the upper bulge region of mouse hair follicles, sustains the architecture and location of the piloneural mechanoreceptor complex. During development of the piloneural complex, EGFL6 is deposited in a highly organized palisade pattern in the upper bulge region and interdigitates tightly with protrusions of the terminal Schwann cells and sensory axon endings of the piloneural complex. In *Egfl6* null mice, the structure of the terminal Schwann cells and sensory nerves is abnormal and they are often located in positions slightly lower than normal on the hair follicle. Electrophysiological analysis of skin-nerve preparation showed the decreased mechano-sensitivity in the KO mouse. Our results indicate that the specialized extracellular matrix acts as a framework to regulate the architecture and function of sensory terminals in the hair follicle.