Figure 1 | The skin and its appendages. Mammalian skin consists of the epidermis and dermis, separated by a basement membrane. The epidermis is a stratified squamous epithelium that is composed of several cell layers. Noting on the basement membrane is the basal layer (BL), consisting of proliferating, transit-amplifying cells (see text). The basal layer stratifies to give rise to differentiated cell layers of the spinous layer (SL), granular layer (GL), and the stratum corneum (SC). Also shown is a cross-section of a hair follicle, which consists of an outer root sheath that is contiguous with the basal epidermal layer. At the bottom of the follicle is the hair bulb, made from proliferating matrix cells. The transit-amplifying matrix cells terminally differentiate to generate the different cell types of the follicle. Also shown is the bulge, which is part of the outer root sheath and is where epidermal stem cells reside. The dermal component of the hair follicle is the dermal papilla, which consists of specialized mesenchymal cells surrounded by the hair matrix cells.
**Figure 1** | Terminal differentiation and apoptosis in the epidermis.

The proteins that are expressed in particular locations in the epidermis during skin differentiation are shown. Apoptosis is restricted to the basal layer, whereas cornification occurs in the suprabasal layers, to form a cornified envelope (see inset). At the molecular level, the cornified envelope is formed by proteins that are highly cross-linked by transglutaminases, with specific sites on the autolysosomes, to guarantee specific physical properties (Table 1). BPAG1, bullous pemphigoid antigen 1; BP180, small prelamine-rich protein TSG; TSG, transglutaminase.

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Figure 4. A hemidesmosome junction. The structure is based on biochemical and molecular evidence of protein-protein interactions in the hemidesmosome. nS92, dystroglycan, and laminin form the core of the hemidesmosome, along with BPAK1, a transmembrane protein with an extracellular domain similar to collagen. BPAK1 and plexin are two hemidesmosomal proteins that are members of the plexin family of cell-cell proteins. These two proteins have intermediate filament-binding domains on their non-filamentary terminal (C) segments. They concentrate on the inner face of the hemidesmosome, and seem to function by linking the keratin intermediate filament cytoskeleton to the transmembrane proteins in the hemidesmosome. BPAK1, bullous pemphigoid antigen 1, epidermal keratin, BPAK2, bullous pemphigoid antigen 2.
Intermediate filaments

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Defects in IF proteins cause human diseases