

العلوم	الكلية
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Histology	المادة باللغة الانجليزية
علم الانسجة	المادة باللغة العربية
الثالثة	المرحلة الدراسية
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Skin Histology	عنوان المحاضرة باللغة الانجليزية
نسيج الجلد	عنوان المحاضرة باللغة العربية
9	رقم المحاضرة
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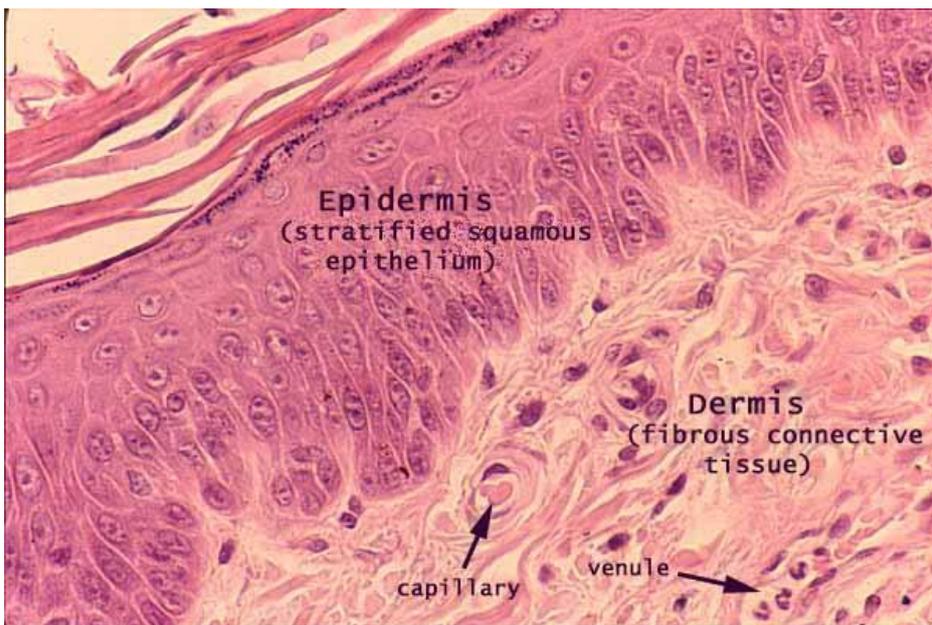
Skin Histology

The skin is the largest organ of the body. As the primary interface between ourselves and our environment, the skin serves several distinct functions.

- *protection*
- *sensation*
- *thermoregulation*
- *communication.*
- Skin is also *self-repairing* after injury.

Layers of skin

- 1- **Epidermis**, the epithelial layer of skin, is primarily protective. This layer, consisting of keratinized stratified squamous epithelium, is tough, relatively impermeable, and self-replacing. These functional qualities are conferred by the epidermis' principal cell type, the keratinocyte.



The epidermis displays several layers

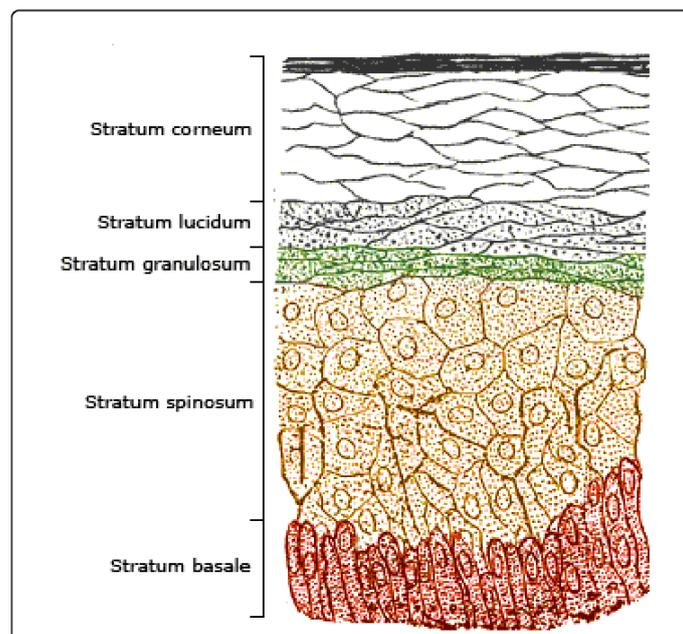
Stratum corneum. Cells of the cornified layer are dead, protective keratinized "squames," eventually sloughed off.

Stratum Lucidum The stratum lucidum is a smooth, seemingly translucent layer of the epidermis located just above the stratum granulosum and below the stratum corneum. This thin layer of cells is found only in the thick skin of the palms, soles, and digits. The keratinocytes that compose the stratum lucidum are dead and flattened. These cells are densely packed with eleiden, a clear protein rich in lipids, derived from keratohyalin, which gives these cells their transparent (i.e., lucid) appearance and provides a barrier to water.

Stratum granulosum. Cells in the granule-cell layer accumulate keratohyalin, visible as darkly stained granules. The presence of this layer is diagnostic for keratinized stratified squamous epithelium.

Stratum spinosum. Cells of the "prickle-cell" layer are attached to one another by desmosomes ("spines") and reinforced by tonofilaments. These cells gradually move outward as new cells are formed from the basal layer.

Stratum basale / stratum germinativum. Cells of the basal layer are attached to the basement membrane (dashed line) by hemidesmosomes. When a basal cell divides, one of the daughters migrates upward to replenish outer layers of cells.

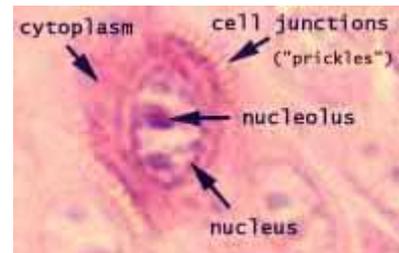


Type of epidermal cell

Keratinocytes

The epidermis consists primarily of keratinocytes. Scattered among the keratinocytes are a few other cell types -- melanocytes, Langerhans cells, and Merkel cells

Keratinocytes, which comprise most of the epidermis, are characterized by numerous intercellular junctions (desmosomes), reinforced by intracytoplasmic tonofilaments. Between these junctions lie intercellular channels which permit nutrients to diffuse from dermis into epidermis.



Keratinocytes in the stratum basale of the epidermis can undergo mitosis. The formation of new cells in this basal layer gradually pushes previously formed cells upward where they become the stratum spinosum. As keratinocytes approach the surface of the epidermis, they accumulate intracellular keratin and secrete a waxy material into the intercellular space; these changes are visible in the stratum granulosum, a distinctive layer which is diagnostic for a keratinized epithelium. As maturing keratinocytes seal off the intercellular spaces through which they receive nutrients, they eventually die and form the stratum corneum, a tough and relatively impermeable layer of hardened, dead cells. Eventually, as cells reach the surface, they are sloughed off. The entire epidermis above the basal layer is replenished (replaced by new cells) within about two weeks. Replacement is accelerated by injury.

Melanocytes manufacture the pigment melanin. Melanocytes appear as small cells, usually in or near the stratum basale. They have thin cytoplasmic processes (not evident in ordinary histological preparations) which extend between nearby keratinocytes and serve to transfer melanosomes (melanin-containing granules) into adjacent keratinocytes. Because of this transfer, most pigment-containing cells in the epidermis are normally keratinocytes rather than melanocytes.

Melanocytes may be found in places other than skin, such the choroid layer of the eye.

Langerhans cells (named after Paul Langerhans, b. 1847) are antigen-presenting cells which participate in the surveillance function of the immune system. (Antigen-presenting cells acquire foreign materials [antigens] and pass them along to lymphocytes.) Langerhans cells are smaller than keratinocytes, with relatively clear cytoplasm, usually located within the stratum spinosum or stratum basale. Langerhans cells are dendritic cells, with extensive cytoplasmic processes extending between keratinocytes to sample intruding antigens throughout the epidermis.

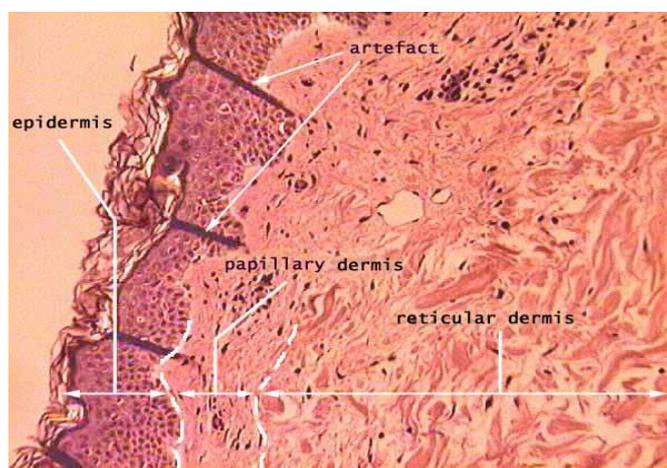
Merkel cells (named after Friedrich Merkel, b. 1845) are small cells associated with nerve endings in epidermis. involved in neural development and tactile sensation. Recent evidence supports a role for Merkel cells in light touch, "suggesting that these cells form an indispensable part of the somatosensory apparatus.

2- Dermis and hypodermis

The dermis consists of dense, fibrous connective tissue whose predominant connective tissue component is collagen. The texture of collagen fibers serves as the basis for recognizing *two layers* of dermis.

The papillary layer of the dermis lies adjacent to the epidermis and consists of relatively small, finely textured collagen fibers. This layer is named after *dermal papillae*, the protrusions of dermal connective tissue which indent the base of the epidermis. Dermal papillae increase the contact area for attachment between dermis and epidermis; they are more pronounced in thick skin.

The reticular layer of the dermis lies beneath the papillary layer and consists of larger, more coarsely textured collagen fibers



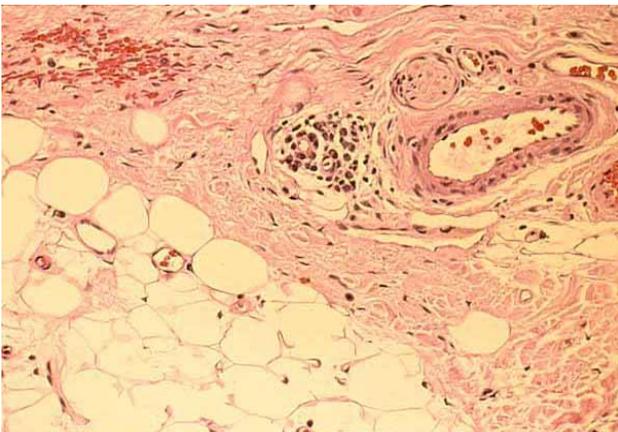
- connective tissue of the dermis serves several distinct functions .Tough collagen fibers and resilient elastic fibers provide mechanical strength for skin. The **ground substance** of the dermis serves as the **substrate for diffusion** of nutrients and wastes to and from various other tissue components.
- **Mast cells**, **lymphocytes** and **macrophages** in the connective tissue carry out **surveillance for the immune system**.
- Finally, the dermis together with its associated blood vessels and nerves is capable of active response to injury, yielding the defensive reaction of **inflammation**, followed by the healing processes of **growth and repair**.

The connective tissue of the dermis grades into **hypodermis**, without a sharp transition or distinct boundary .

Over most of the body, hypodermis is characterized by adipocytes and may comprise a thick layer of adipose tissue. In some sites (e.g., "**dimples**"), hypodermis is fibrous and binds the dermis to underlying structures. Hair follicles and sweat glands may extend into hypodermis

Blood vessels are generally larger in the deeper layers of skin, with only capillaries in the papillary layer of the derm

dermis and hypodermis



hypodermis

