

The skin is a protective, elastic, water proof and Sensitive covering. It is consist

- 1- Epidermis, an epithelial layer of ectodermal origin.
- 2- 2-dermis, a layer of connective tissue mesodermal origin.
Beneath the dermis lies the
- 3- Hypodermis or Subcutaneous tissue, a loose connective tissue that may contain adipose cells.

Functions

- It serves as a barrier against infection.
- It is impermeable prevents pass of fluids from the external environment.
- It is a hydrophobic layer prevents loss of body fluids.
- It regulates body temperature by regulating the blood flow through the capillary beds and by sweating.

Types of Skin

Two types based on the comparative thickness of the epidermis into; *thin* and *thick* skin.

- Thick skin is smooth, non-hairy, and is found in the palms and soles.
- Thin skin is hairy, and is found elsewhere on the body.

The epidermis.

*The epidermis is a stratified squamous keratinized epithelium and contains melanocytes, keratinocytes, langerhans cells and merkel cells. The epidermis is subdivided into five layers. Stratum corneum, St.lucidum, St.granulosum, St.spinosum and St.basale.

• **Epidermis contains two types of cells :**

A – Keratinocyts

- They are keratin forming cells. - Cell differentiation (Keratinization)
- They are organized into layers and become mature in about 4 weeks.
- Each layer represents a dynamic stage of cell division and cell maturation.
- Cell renewal (Mitosis) - Exfoliation (Sloughing off the dead cells OFF)

B - Non-Keratinocytes:

Melanocytes

Langerhans cells

Merkel's cells

The junction of epidermis & dermis is irregular & projections of the dermis called papillae interdigitate with evagination of the epidermis. Called epidermal ridges.

***St.corneum**

The cells consist of St.corneum are flattened Nonnucleated keratinized cells. The cytoplasm Filled with protein called keratin.

After keratinization these cells consist only fibrillar And amorphous protein and thickened plasma Membranes, they are called horny cells. These cells are continuously shed at the surface of the st.corneum.

***St.lucidum**

This layer is translucent, thin layer of flattened Eosinophilic epidermal cells.

Through electron Microscope, the organelles and nuclei are no longer and the cytoplasm consist primarily of densely packed keratin filaments and the desmosomes are still evident between adjacent cells.

***St.granulosum**

The cells of this layers are flattened polygonal Cells and the cytoplasm is filled with basophilic granules called kerato hyalin granules.

St.spinosum*

The cells of this layer are cuboidal or slightly flattened with a central nucleus and a cytoplasm are filled with bundles of keratin filaments. These keratin bundles, visible under Light microscope are called tonofilaments.

Its play a role in resisting the effects of abrasion.

***St.basale(germinativum)**

These layer consist of a single layer of basophilic columnar or cuboidal cells, these cells contain desmosomes bind cells to gather and Upper surface.

These cells contain stem cells responsible for mitotic activity & conjunction with the next layer.

The St.basale & spinosum formation a malpighian layer responsible for Mitosis & these layer only contains epidermal Stem cells.

Melanocytes.

*It's a specialized cell of the epidermis found Between the cells of St.basale , in the hair follicles & produce melanin , a pigment protect the skin from sun ultra violet & produce a dark brown pigment called Eumelanin & produce a pigment found in the red hair is called pheomelanin.

Langerhans cells

Its star shaped cells found mainly in the st.spinosum. They bone marrow derived, carried to the skin by the blood & have a role in immunological skin reaction.

Merkels cells:

Present in thick skin of palms & Soles resemble the epithelial cell, but have small dense granules in their cytoplasm. These cells act a sensory mechanoreceptors & they have functions related to the diffuse neuroendocrine system.

Dermis.

*The dermis is the C.T that support the epidermis & Binds it to the S/C tissue (hypodermis).The thickness of the dermis varies according to the Region of the body.

*The surface of the dermis is very irregular & has many projections (dermal papillae) that interdigitate with projections (epidermal ridges) of the Epidermis.

*A basal lamina is found between the St.basale and the papillary layer of the dermis.

***Lamina reticularis:**

It's a delicate network of reticular fibers present underlying the basal lamina and this composite the basement membrane.

*The dermis contains two layers.

A-outer called papillary layer.

B-deeper called reticular layer.

*The thin papillary layer is composed of loose C.T fibroblasts, mast cells and macrophages.

***Anchoring fibrils:** Its special collagen fibrils from papillary layer insert into basal lamina & extend into the dermis, they bind the dermis to the epidermis.

***Reticular layer:**

It's thicker & composed of irregular dense C.T & therefore has more fibers& fewer cells than dose the papillary layer.

*The dermis also contains epidermal derivatives such as hair follicles, sweat gland & sebaceous gland, there are a rich supply of nerves.

*Hypodermis (subcutaneous tissue).

This layer consists of loose C.T that binds the skin loosely to the subjacent organs.

The hypodermis contains fat cells that vary in number according to the area of the body & vary in size according to the nutritional state.

***Vessels & skin sensorial receptors**

*The arterial vessels that nourish the skin form two plexuses:

1-Located between the papillary & reticular layers.

2-Located between the dermis & S/C tissue.

*The lymphatic vessels found as closed sacs in the dermal papillae & converge to form two plexuses similar to the artery.

*One of the most important functions of the skin with its great extension & abundant sensory innervations, is to receive stimuli from the environment. The skin is the most extensive sensory receptor.

*Numerous free nerve endings in the epidermis & hair follicles, cutaneous glands & expanded receptors are present in the dermis & S/C tissue.

***Hairs.**

Its elongated keratinized structures derived from invaginations of epidermal epithelium.

Their color, size and disposition vary according to race, age, sex, and region of the body. Hairs are found everywhere on the body except on the palms, soles, lips, glans penis, clitoris, and labia minora.

***Growth of hairs**

1-Each hair arises from an epidermal invagination

2-During the growth of hair follicle has a terminal dilation called a hair bulb.

3 – The epidermal cells covering the dermal papilla (containing capillaries) forming the hair root & develop in to hair shaft.

4 – The cell makeup the hair bulb are divide & differentiate into specific cells types.

A - The cells of the central region of the root at

The apex of the dermal papilla produce large, vacuolated and moderately keratinized cells that form the medulla of the hair.

B-Root cells multiply & differentiate in to heavily keratinized & compactly grouped fusiform cells that form the hair cortex.

C -The cells in the periphery are produce the hair cuticle.

5 – The peripheral epithelial cells develop in to the internal & external root sheaths.

The external is continuous with the epidermis, but the cells of Internal root sheaths degenerate & disappear.

6-The hair follicle separated from the dermis by non-cellular hyaline layer called glassy membrane.

7-Hair color is created by the activity of melanocytes located between the papilla & the epithelial cells of the hair root.

***Sebaceous gland**

1-S.gland embedded in the dermis over most of the body surface.

2-There are about 100/cm² over most of the body, but increase to 400-900/cm² in the face, fore head & scalp.

3-S.gland not found in the glabrous skin of the palms & soles.

4-S.gland are acinar gland opening in the upper portion of a hair follicle but in glans penis, glans clitoris & lips it opens directly on to epidermal surface.

5-The acini consist of a basal layer of undifferentiated flattened epithelial cells that rests on the basal lamina, these cells proliferate

and differentiate & filling the acini with rounded cells containing fat droplets in their cytoplasm

6-Their nuclei of cells are shrinkage and the cell become filled with fat droplets.

The product of this process is called Sebum, the function of sebum may have weak antibacterial & antifungal properties.

7-The S. gland is a holocrine gland, because its

Product of secretion is released with remnant of dead cells. This product comprises a complex mixture of lipids that includes triglycerides, waxes, and cholesterol.

*Sweat gland.

1-The S. gland are widely distributed in the skin except in the glans penis.

2-The merocrine S. gland are simple, coiled tubular gland whose **ducts open at the skin surface.**

3-Their ducts do not divided, and their diameter is thinner than that of the secretory portion. The ducts of gland are lined with stratified cuboidal epithelium.

4-The secretory part of the gland is embedded in the dermis and surrounded by myoepithelial cells. When contraction of these cells help to discharge the secretion.

5-The secretory portion of gland have two type of cells.

A-Dark cells: are pyramidal cells that line most of the luminal surface of this portion of the gland. Their basal surface does not touch the basal lamina. Secretory granules containing glycoproteins are abundant in their apical cytoplasm.

B-Clear cells: are devoid of secretory granules.

Their basal plasma lemma has the numerous invaginations characteristic of cells involved in trans-epithelial salt and fluid transport.

- 6-The fluid secreted by sweat glands is not viscous & contains little protein. Its main components are water, sodium chloride, urea, ammonia, and uric acid.
- 7-another type of sweat gland is called apocrine gland. Its present in the axillary, areola, and anal region, this gland are much larger than merocrine sweat gland. They are embedded in the dermis & hypodermis and **their ducts open into hair follicles**. These gland produce a viscous secretion that is initially odorless but may acquire a distinctive odor as a result of bacterial decomposition.