



Objective:

- **Skin Dermis**
 - **subcutaneous tissue.**
 - **Vessels & senso receptors Nails, glands of the skin Sebaceous glands Sweat glands**
-

Skin

Skin with its accessory organs sweat ,sebaceous , glands and hair follicles forms the largest organ of the body 1.5-2 m² and about 16% of body weight .

Function of skin

1-Protection

2- Protects the under lying structures from abrasion, invasion, water loss and UV

3- Vitamin D synthesis , Epidermal keratinocytes when exposed to UV light synthesis vit. D.

3-Sensation, Skin contains receptors for heat, cold, touch, pressure, vibration and pain.

4- Thermoregulation , Skin contains thermo receptors and sweat glands

5- Psychological and social functions.



Structures of Skin:

The skin is made up of three main layers:

- 1. Epidermis**
- 2. Dermis**
- 3. Subcutaneous Hypodermis (fascia).**

1. Epidermis.

The epidermis is generally thin except in the palm and the sole of the feet it is thick to protect these parts and withstand friction, wear and tear that occurs in these regions.

Epidermis consists of 3 layers:

1-Stratum corneum (horny layer) : This layer contains continually shedding, dead keratinocytes.

2.Stratum granuloza

3.Stratum Spinoza: This layer contains living keratinocytes (squamous cells), which help to provide the skin with what it needs to protect the rest of the body.

4. Basal layer: the basal layer is the inner layer of the epidermis, containing basal cells. Basal cells continually divide, forming new keratinocytes and replacing the old ones that are shed from the skin's



surface, the epidermis also contains melanocytes, which are cells that produce melanin (skin pigment).

2- Dermis

Connective tissue containing (blood vessels, lymph vessels, sensory nerve endings, smooth muscles, hair follicles, sweat and sebaceous glands), In its deep part the collagen bundles are arranged in parallel rows.

The dermis layer is made up of two sub layers:

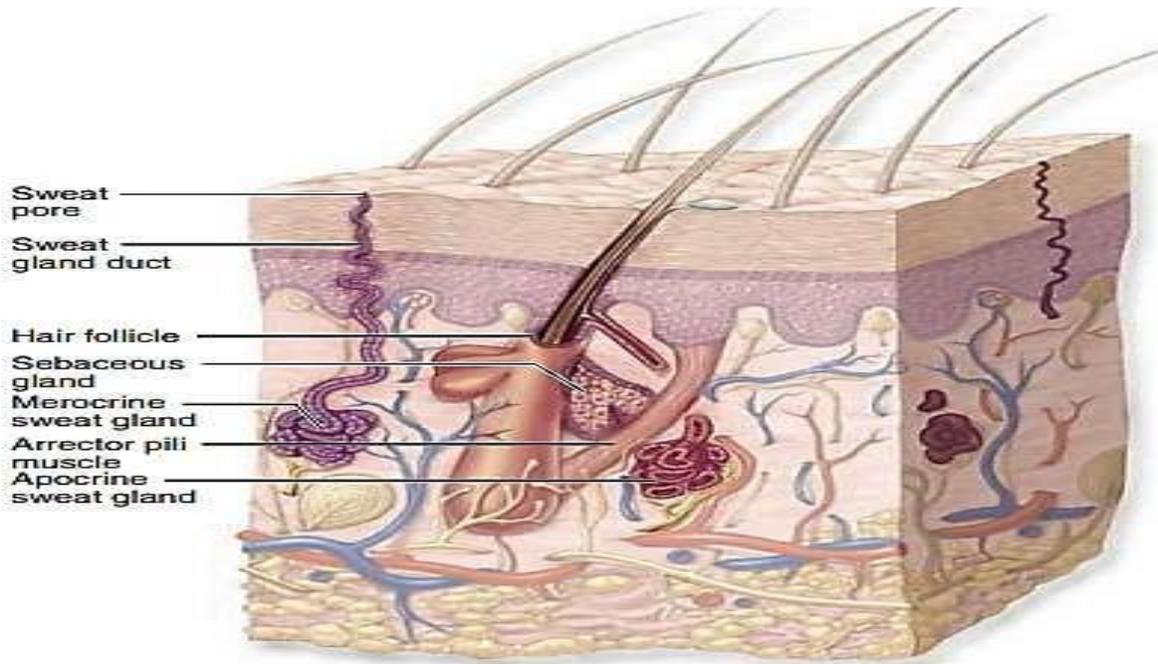
- 1. The papillary layer:** Contains a thin arrangement of collagen fibers. It supplies nutrients to the epidermis and regulates temperature.
- 2. The reticular layer :** Is thicker and made of thick collagen fibers that are arranged in parallel to the surface of the skin, strengthens the skin, providing structure and elasticity, supports other components of the skin, such as hair follicles, sweat glands, and sebaceous glands.



Histology

2nd Class

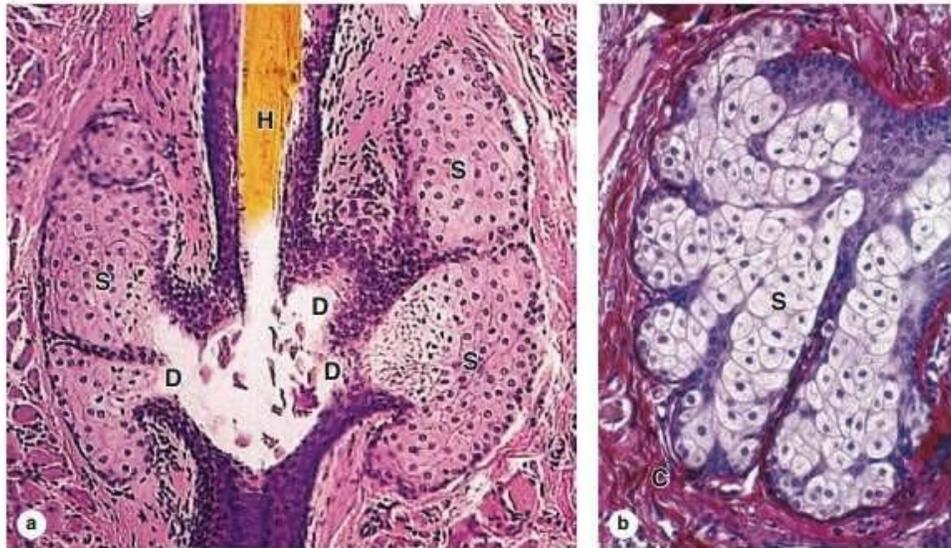
Prof. Dr. Marwa Fadhil Alsaffar



Skin appendages **Sebaceous Glands**

Sebaceous glands are embedded in the dermis over most of the body, except in the thick, glabrous skin of the palms and soles. There is increases to in the face and scalp. Sebaceous glands are **branched acinar glands** with several acini converging at a short duct that usually empties into the upper portion of a hair follicle. A hair follicle and its associated sebaceous glands make up a pilosebaceous unit. The stem cell niche of the follicle's bulge region also forms the progenitor cells of the associated sebaceous glands.

FIGURE 18-17 Sebaceous glands.



Sebaceous glands secrete a complex, oily mixture of lipids called **sebum** into short ducts that in most areas open into hair follicles. Sebum production is the classic example of holocrine secretion, in which the entire cell dies and contributes to the secretory product.

(a) A section of a pilosebaceous unit shows acini composed of large sebocytes (**S**), which undergo terminal differentiation by

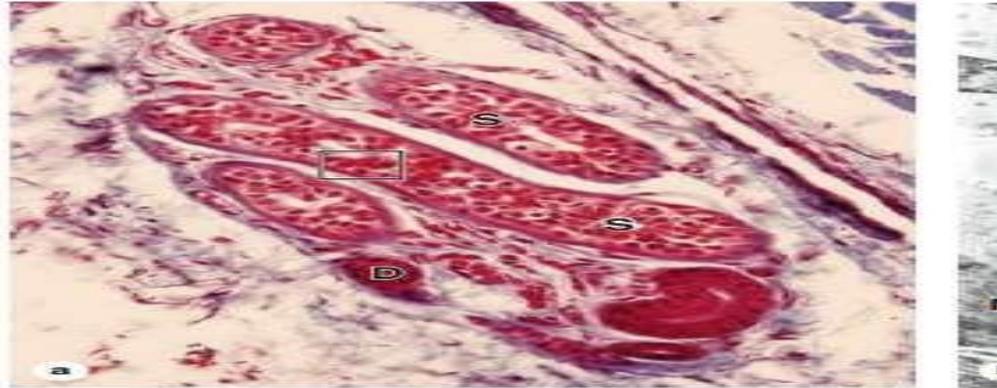
filling with small lipid droplets and then disintegrating near the ducts (**D**) opening at the hair (**H**) shaft (X122; H&E)

(b) A micrograph shows the gland's capsule (**C**) and differentiates sebocytes (**S**) at higher magnification. Proliferation of the small progenitor cells just inside the capsule continuously forces sebum into the ducts; myoepithelial cells are not present. (X400; H&E)

Sweat Glands

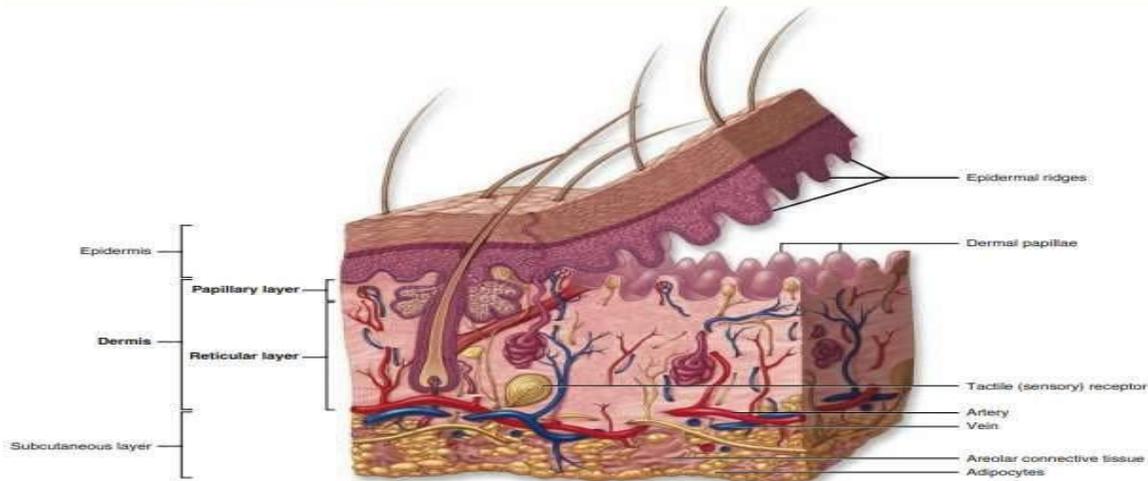
Sweat glands develop as long epidermal invaginations embedded in the dermis (Figure 18-1). There are two types of sweat glands, eccrine and apocrine, with distinct functions, distributions, and structural details. Eccrine sweat glands (Figures 18-16 and 18-18) are widely distributed in the skin and are most numerous on the foot soles. Sweating is a physiologic response to increased body temperature during physical exercise or thermal stress and is the most effective means of temperature regulation of humans. Both the secretory components and ducts of eccrine sweat glands are coiled and have small lumens.

FIGURE 18–18 Eccrine sweat glands.



(a) Histologically eccrine glands have small lumens in the secretory components (S) and ducts (D), both of which have an irregular stratified cuboidal appearance. Both clear and acidophilic cells are seen in the stratified cuboidal epithelium of the secretory units. The box indicates an area with such cells like that shown ultrastructurally in part (b). (X200; Mallory trichrome)
(b) TEM of these important thermoregulatory structures reveals three cell types in their secretory portions. Myoepithelial cells (M) are present at the basal lamina (BL) to propel sweat into the

FIGURE 18–1 Layers and appendages of skin.



Diagrammatic overview of skin, showing the major layers and epidermal appendages (hair follicles, sweat, and sebaceous glands), the vasculature, and the major sensory receptors. Activate

The secretory part is generally more pale-staining than the ducts and consists of an unusual stratified cuboidal epithelium with three cell types (Figure 18–18b):

1. **Pale-staining clear cells** located on the basal lamina produce the sweat, having abundant mitochondria and microvilli to provide large surface areas. Interstitial fluid from the capillary-rich dermis around the



Histology

2nd Class

Prof. Dr. Marwa Fadhil Alsaffar



gland is transported through the clear cells, either directly into the gland's lumen or into intercellular canaliculi that open to the lumen.

2. **Dark cells filled with strongly eosinophilic granules** line most of the lumen and do not contact the basal lamina (Figure 18–18). The granules undergo merocrine secretion to release a poorly understood mixture of glycoproteins with bactericidal activity.
3. **Myoepithelial cells** on the basal lamina (Figure 18–18b) contract to move the watery secretion into the duct.

Apocrine sweat glands

are largely confined to skin of the axillary and perineal regions. Their development depends on sex hormones and is not complete and functional until after puberty. The secretory components of apocrine glands have much larger lumens than the eccrine glands (Figure 18–19) and consist of **simple cuboidal**, eosinophilic cells with numerous secretory granules that also undergo exocytosis. The ducts of apocrine glands are usually open into hair follicles at the epidermis. The slightly viscous secretion is initially odorless but may acquire a distinctive odor as a result of bacterial activity. **Apocrine sweat glands** are innervated by **adrenergic nerve endings**, whereas **eccrine sweat glands** receive **cholinergic fibers**.



Histology

2nd Class

Prof. Dr. Marwa Fadhil Alsaffar

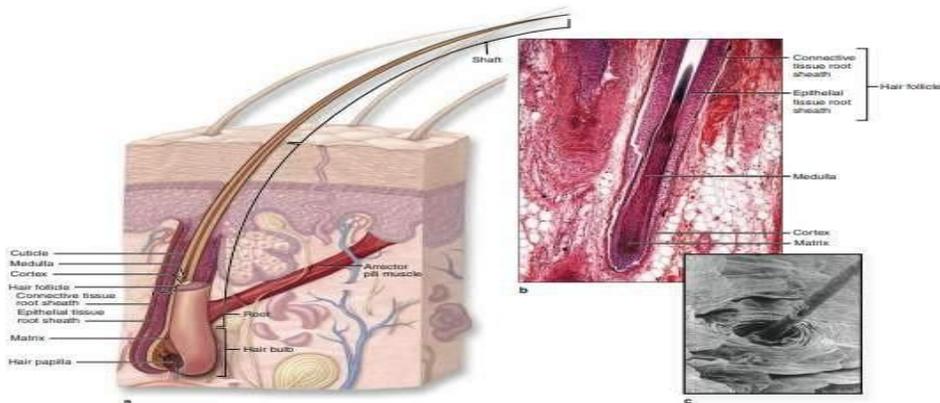


HAIR

Hair follicles: invaginations of the epidermis into the dermis, the hair grows out of these follicles

(hair shaft). *Hair bulb: the expanded extremity of the follicle, concaved at the end (located deep in the dermis). *Hair papilla: a vascular connective tissue that occupies the concavity of the bulb.

FIGURE 18-13 Hair.



All types of body hair have a similar composition and form in hair follicles derived from the epidermis but extending deep into the dermis.

(a) The diagram shows major parts of a hair and its follicle, including vascularized, nutritive hair dermal **papilla** and the **arrector pili muscle** that pulls the hair erect.

(b) A longitudinal section of a hair root and bulb shows the **matrix**, **medulla**, and **cortex** in the root and the surrounding

epithelial and connective tissue sheaths. Cells of the hair bulb matrix proliferate, take up melanin granules, and undergo keratinization to differentiate as the three concentric layers of the hair. (X70; H&E).

(c) The outermost layer of the hair is the thin **cuticle**, composed of shingle-like cells, shown in this SEM of a hair shaft emerging at the stratum corneum. (X250)

The arrector pili muscle,

A band of smooth muscle connects the undersurface of the follicle to the superficial part of the dermis. It is innervated by sympathetic fiber. Its contraction causes the hair to move into a more vertical position. It compresses the sebaceous gland and causes it to secrete sebum.

NAILS

Is a flat horny plate on the dorsal surface of tips of the fingers and toes.

It has 3 parts:

* Root: proximal edge (part embedded in skin)



Histology

2nd Class

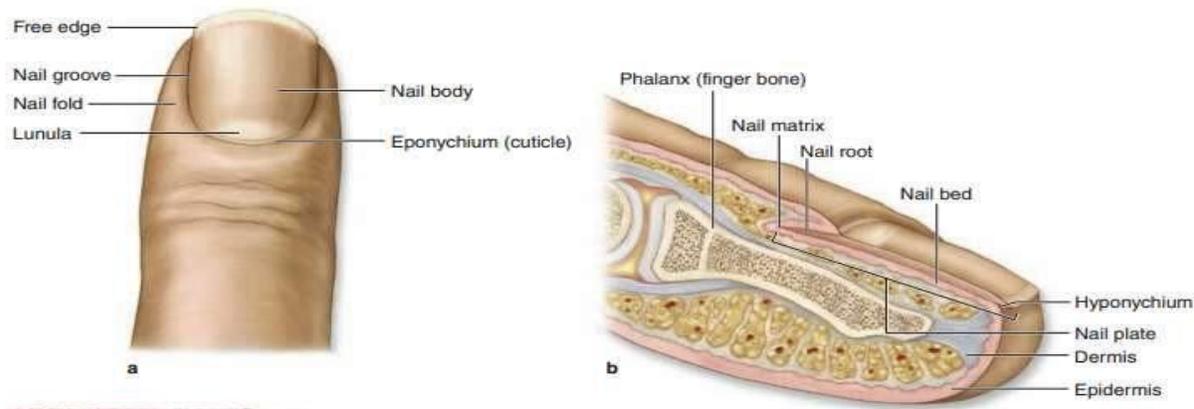
Prof. Dr. Marwa Fadhil Alsaffar



* body: exposed part & has a free distal edge

*Nail fold: folds of skin surround and overlap the nail.

FIGURE 18–15 Nails.



3- Fascia:

Is a collection of connective tissues between skin and skin and the underlying muscles and bones. It is divided into 2 types:

1- Superficial fascia:

Loose, mixture of adipose and loose areolar tissues unites the skin to the underlying structures. It is dense in some places as scalp, palm of hand and sole of foot and contains collagen bundles, and is thin in the eyelids, auricle, scrotum, penis and clitoris (devoid of adipose tissue).

Functions:

Facilitates movement of skin over underlying structures.

Passage for cutaneous vessels, nerves.

Protects the body against heat loss.



2-Deep fascia: Deep fascia is denser than superficial fascia, with more compact and regularly arranged collagen bundles. It usually appears as membranes and has several forms and functions:

- **Intermuscular septum:** Lies between muscles and divides the limbs into compartments.
- **Investing fascia:** Covers the surfaces of muscles.

In different regions:

- **Neck:** Forms well-defined layers that bound fascial spaces, limiting or directing the spread of infection.
- **Abdomen:** Thin layer covering the muscles.
- **Limbs:** Forms definite sheaths around muscles.
- **Retinaculum:** A localized thickening of deep fascia around joints that holds tendons in place and prevents bowstringing.