Skin
The integument

Skin

- The largest organ of the human body.
- Typically accounting for 15% -20% of total body weight and, in adults, presenting 1.5-2 m^2 of body surface.
- Also known as the integument or cutaneous layer.

Functions of the skin :

1- Protective: It provides a physical barrier against thermal and mechanical insults such as friction and against most pathogens.

2- Thermoregulatory: by maintaining constant body temperature (insulating components: eg, the fatty layer and hair on the head) and accelerating heat loss (sweat production).

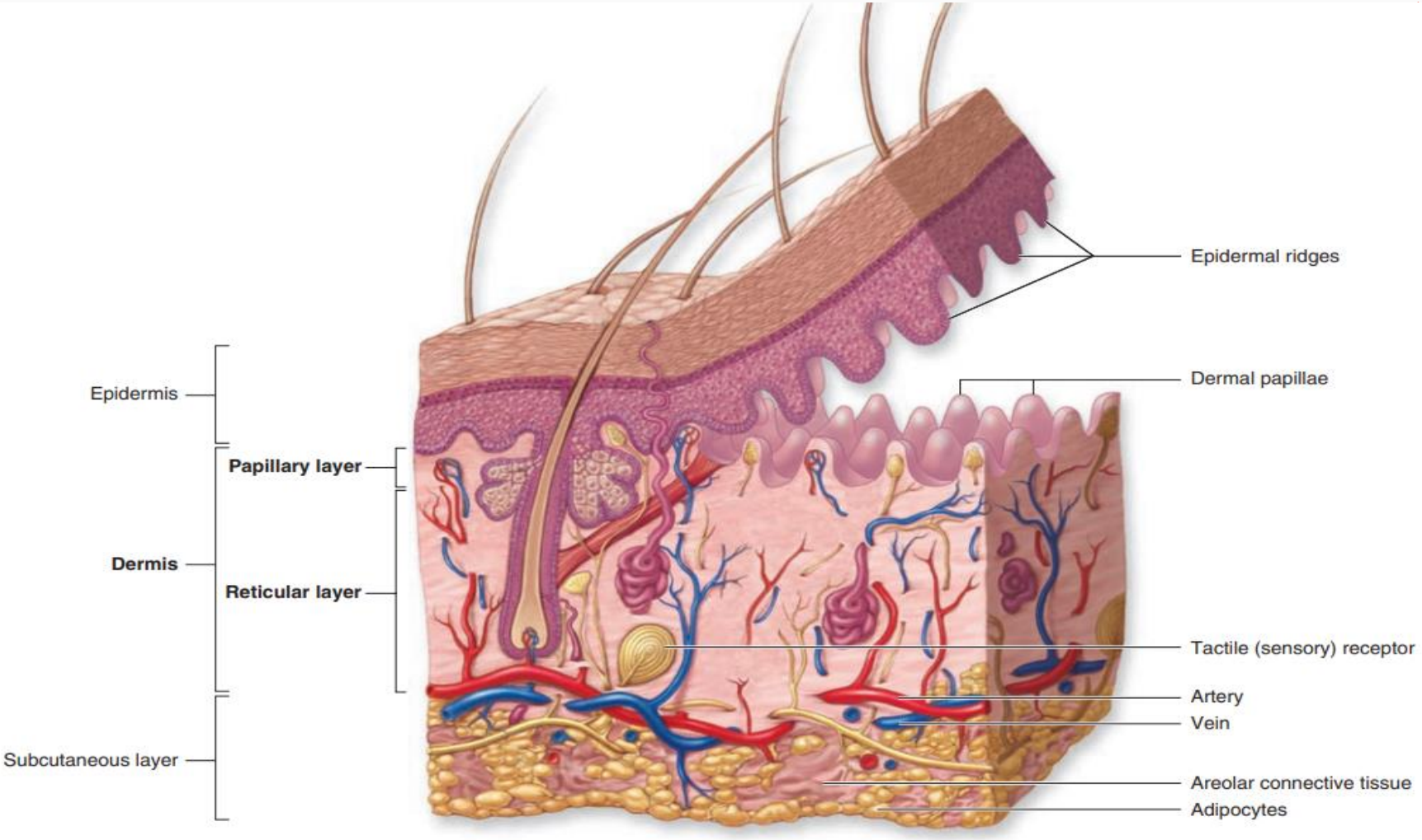
3- Sensory: sensory receptors allow skin to constantly monitor the environment.

4- Metabolic: Cells of skin synthesize vitamin D3 , excess electrolytes can be removed in sweat, and the subcutaneous layer stores a significant amount of energy in the form of fat.

Skin is composed of

- Epidermis: an epithelial layer,
- Dermis: connective tissue,
- Epidermal derivatives: include hairs, nails, and sebaceous and sweat glands.

Subcutaneous tissue: lies beneath the dermis , loose connective tissue layer usually containing adipocytes.


Epidermal ridges
Dermal papillae
Epidermis
Papillary layer
Dermis
Reticular layer
Tactile (sensory) receptor
Artery
Vein
Subcutaneous layer
Areolar connective tissue
Adipocytes

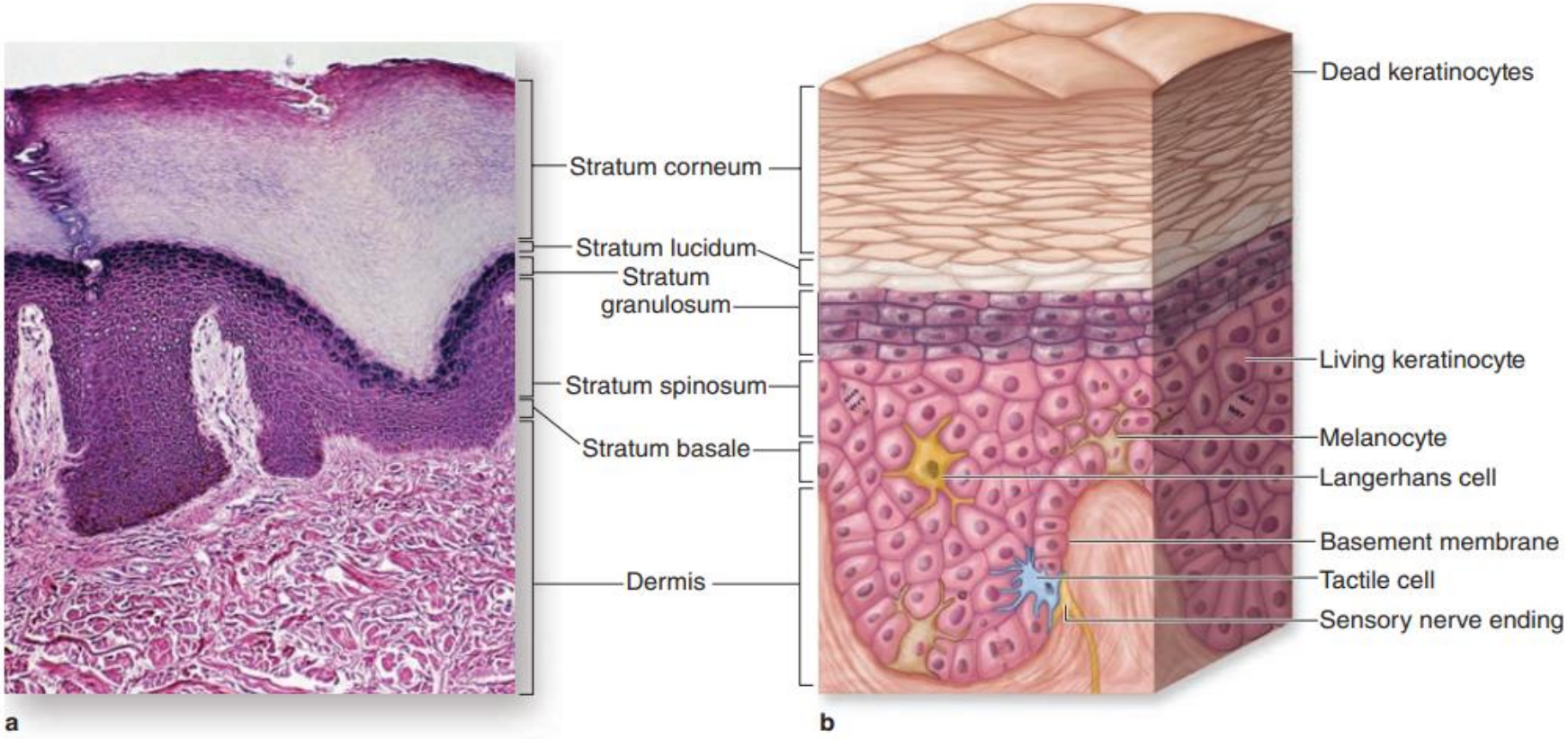
Epidermis: consists of a stratified squamous keratinized epithelium tissues composed of cells called **keratinocytes** and three other epidermal cell types:

- Melanocytes: (pigment producing cells) are specialized cell of the epidermis found among the cells of the basal layer and in hair follicles. produces pigments such as eumelanin: brownish color, pheomelanin: dusky color and carotene: yellowish color.

The color of the skin is the result of the keratinocytes' content of melanin and carotene, and the number of blood vessels in the dermis.

- Langerhans cells (Dendritic cells): the antigen-presenting cells derived from monocytes. Langerhans cells, with lymphocytes and other APCs in the dermis, comprise a major component of the skin’s adaptive immunity.
- Merkel cells (Tactile cells) are mechanoreceptors essential for sensing gentle touch and are abundant in highly sensitive skin like that of fingertips and at the bases of some hair follicles .

FIGURE **18–2** **Layers (strata) of epidermis in thick skin.**

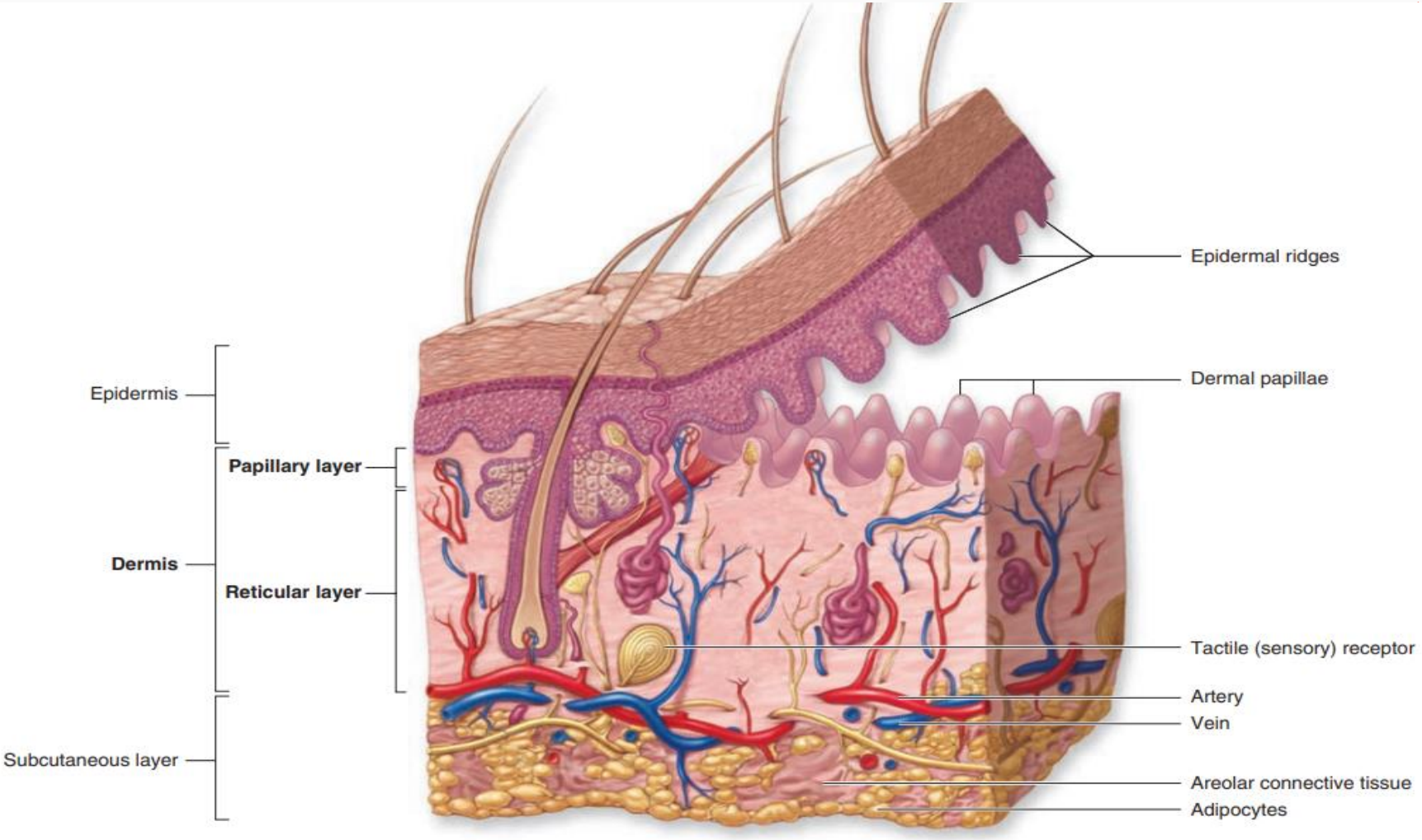


Dermis: represents the connective tissue that supports the epidermis and binds it to the subcutaneous tissue.

Dermis is irregular and has many projections especially in skin subject to frequent pressure, where they reinforce the dermal-epidermal junction.

The dermis contains two sub-layers

- Papillary layer: consists thin of loose connective tissue.
- Reticular layer: is much thicker, consists of dense irregular connective tissue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Subcutaneous tissue also called the hypodermis or superficial fascia,

- consists of loose connective tissue that bind skin to the subjacent organs, making it possible for skin to slide over them.
- contains adipocytes .
- The rich vascular supply in this part promotes rapid uptake of insulin and other drugs injected in this region.

Vessels and sensory receptors in skin

- The skin functions as an extensive receiver for various stimuli from the environment.
- Connective tissue of skin contains a rich network of blood and lymphatic vessels.
- Dermal vasculature has thermoregulatory function.

Skin has a variety of **sensory receptors** such as:

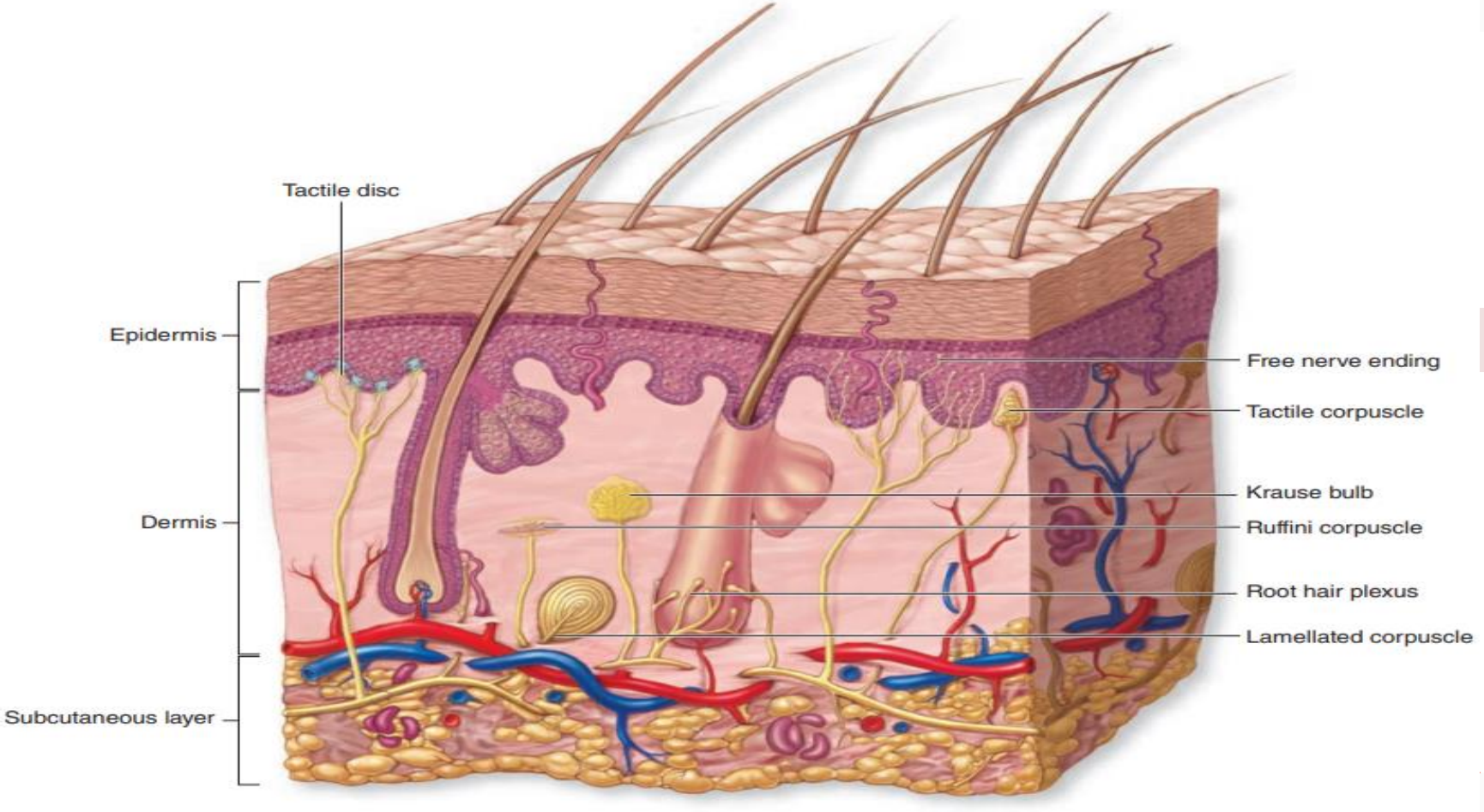
1- Tactile discs: receptors of light touch .

2- Free nerve ending: which respond primarily to high and low temperatures, pain, and itching .

3- Root hair plexuses: detects the movement of hairs.

4- Meissner tactile corpuscles: located in dermis, detect light touch. They are numerous in the fingertips, palms, and soles .

5- Lamellated corpuscles: located deep in the dermis or in the subcutaneous tissue ,sensing coarse touch, pressure and vibrations.


Tactile disc
Epidermis
Dermis
Subcutaneous layer
Free nerve ending
Tactile corpuscle
Krause bulb
Ruffini corpuscle
Root hair plexus
Lamellated corpuscle

Glands of skin

1- Sebaceous glands: are holocrine branched acinar glands embedded in dermis over most of the body surface except palms and soles.

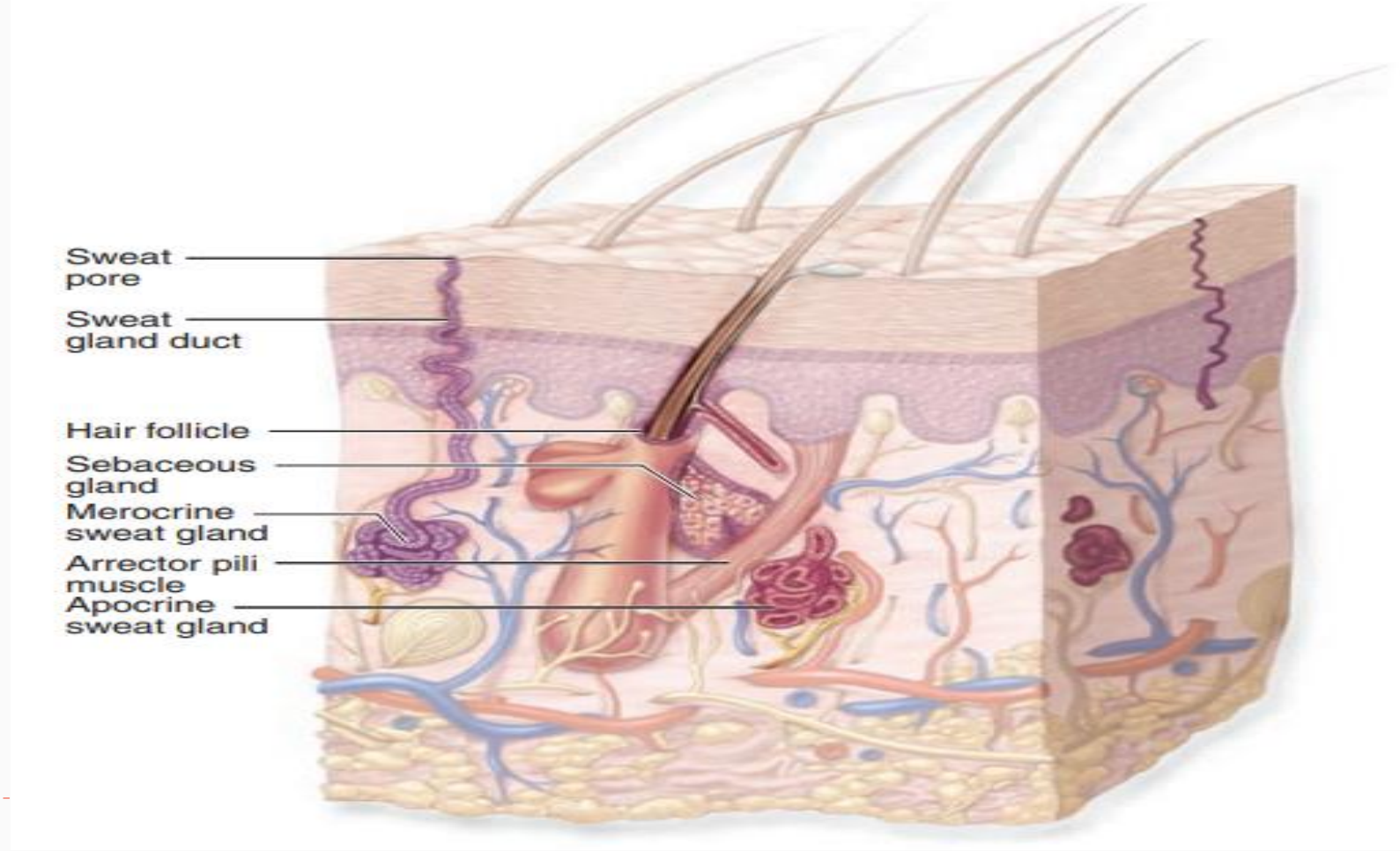
- About 100 gland/cm^2
- Produces sebum which is a complex mixture of lipids, cholesterol, and triglycerides.
- Sebum helps maintain the superficial epidermis and hair shafts .

2- Sweat glands

Eccrine sweat glands :

- Widely distributed in the skin and are most numerous on the foot soles.
- 3 million eccrine sweat glands of the average person ,and produce as much as 10 L/day.
- Sweating is a physiologic response to increased body temperature and is effective means of temperature regulation of humans.

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.


Sweat pore
Sweat gland duct
Hair follicle
Sebaceous gland
Merocrine sweat gland
Arrector pili muscle
Apocrine sweat gland

THANK YOU