

Integumentary System

- Skin can be called the cutaneous membrane or integument. (So, you might have heard the term 'subcutaneous' before what would that mean?)
- Covers the entire surface of the human body
 - Largest organ in the human body

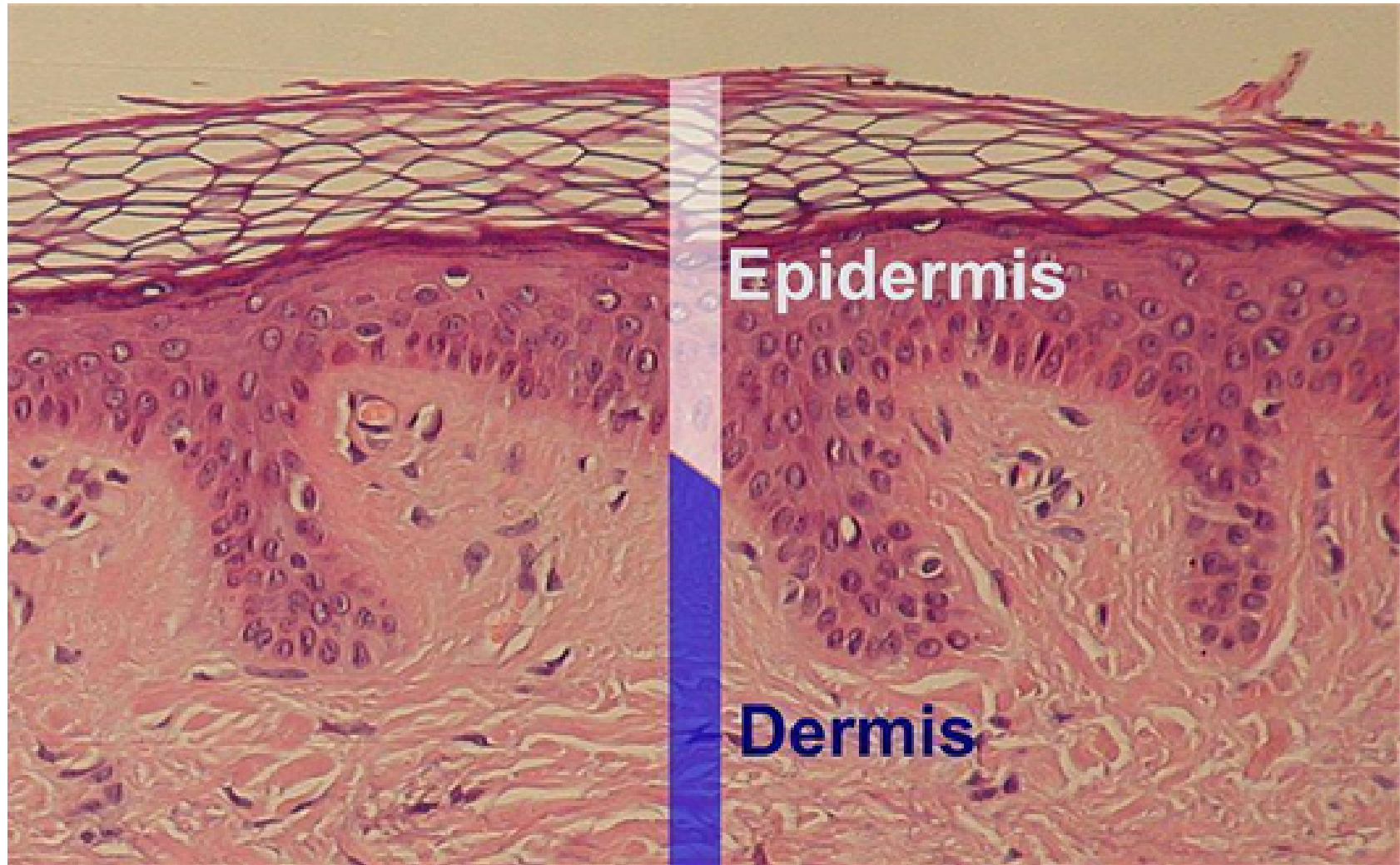
- Surface area of about 1.8 square feet



- Includes four tissue types: epithelial, connective, muscle, and nervous
- Several accessory organs; the entire organ system is called the integumentary system

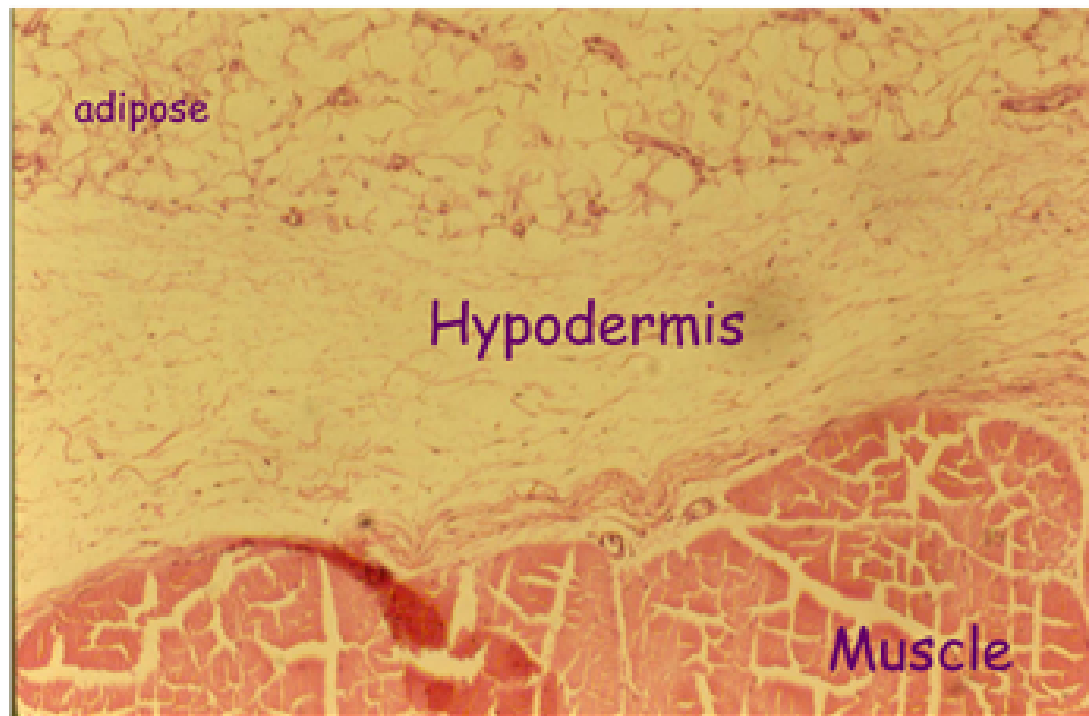


- Skin has two regions: epidermis and dermis



- hypodermis; a subcutaneous tissue found between the skin and any underlying structures like muscle

Integumentary: Hypodermis



- most often loosely attached to underlying muscle tissue but if no muscle is present, it attaches directly to bone bone ex. 'flexion creases' where skin attaches directly to the joints of fingers

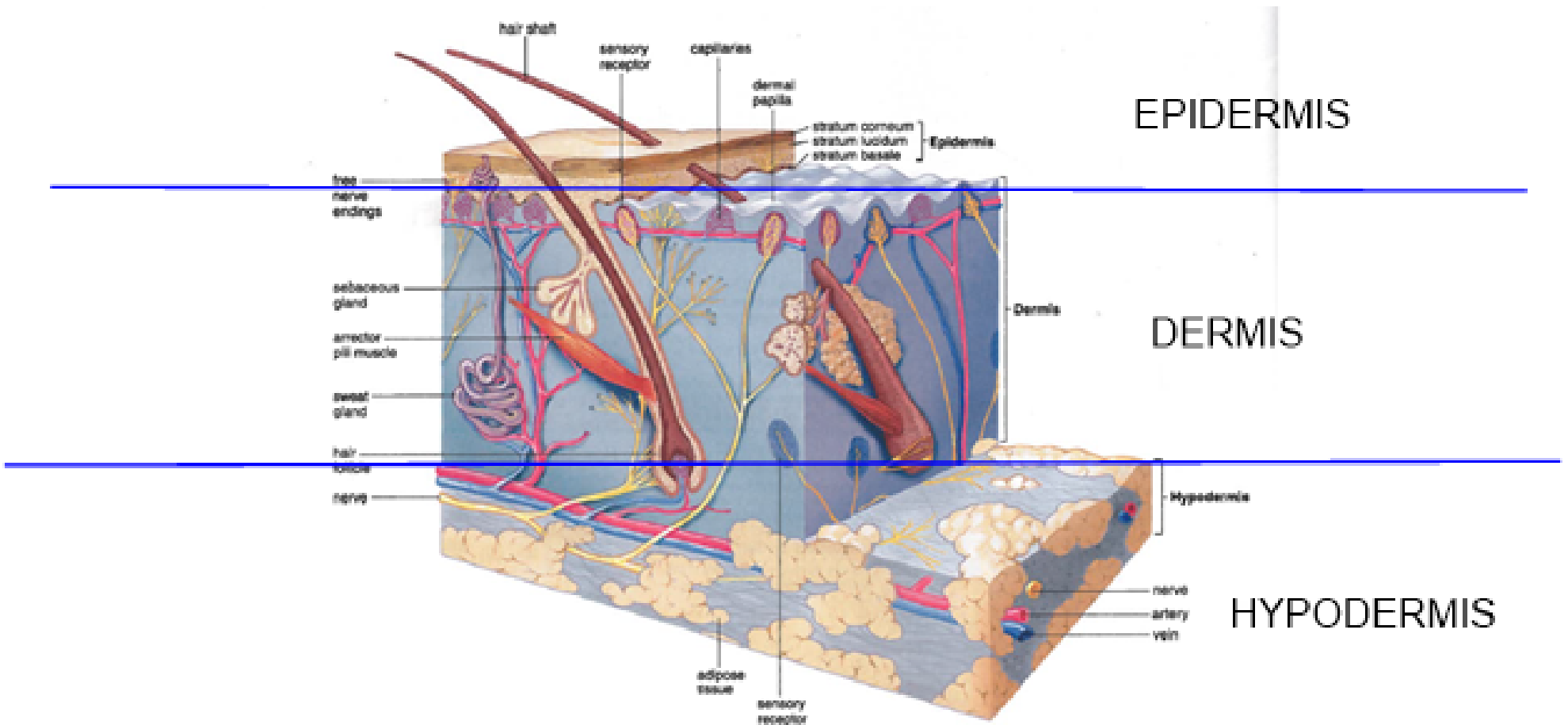


Figure 5.1 Skin anatomy. Skin is composed of two regions: the epidermis and the dermis. The hypodermis, or subcutaneous layer, is located beneath the skin.

Epidermis

- the outer and thinner region of the skin
- made up of stratified squamous epithelium divided into five layers (strata) - these will be shown in the next slide
- Like all epithelial tissues, epidermis lacks blood vessels and has tightly packed cells

Superficial to
Deepest =

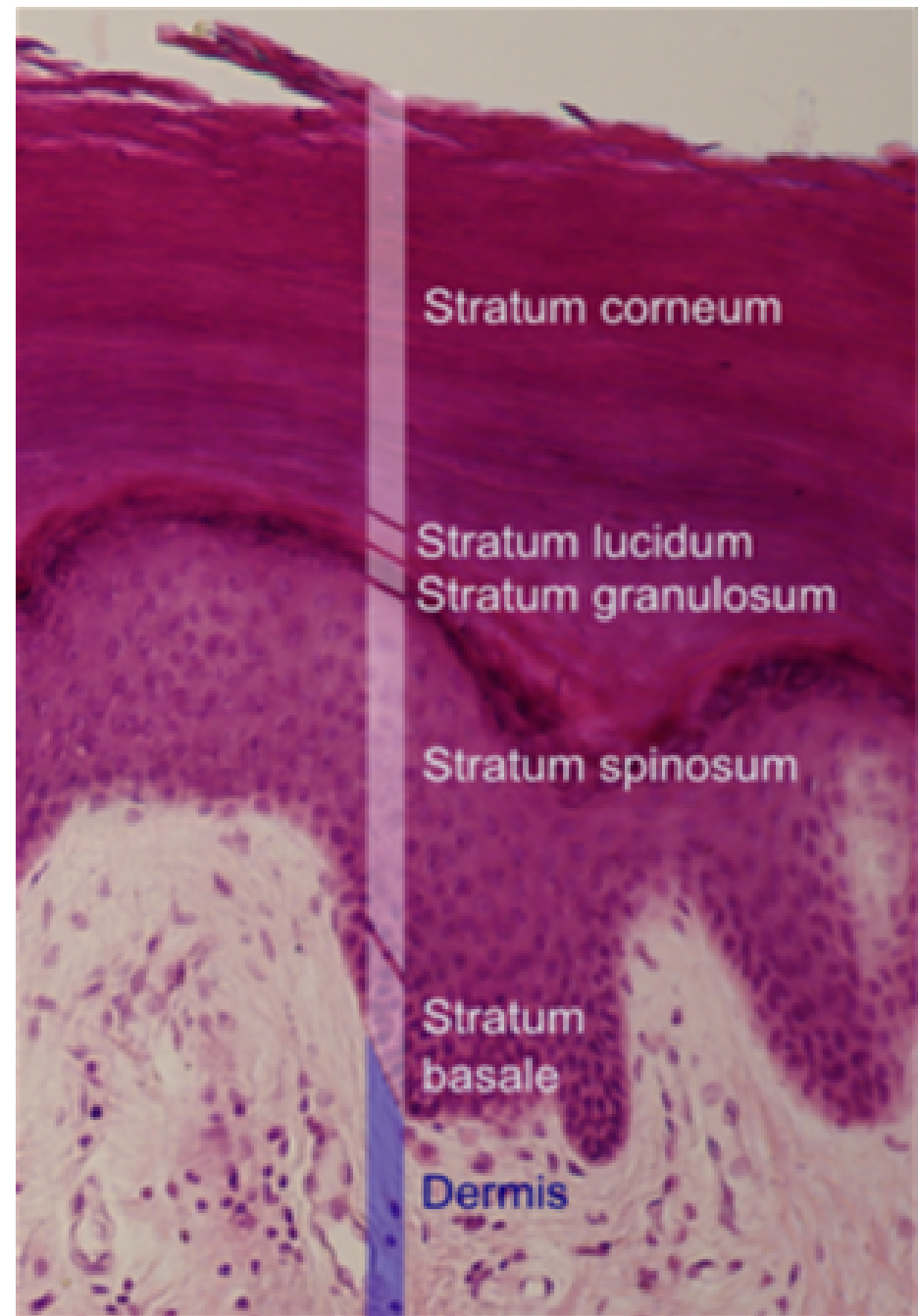
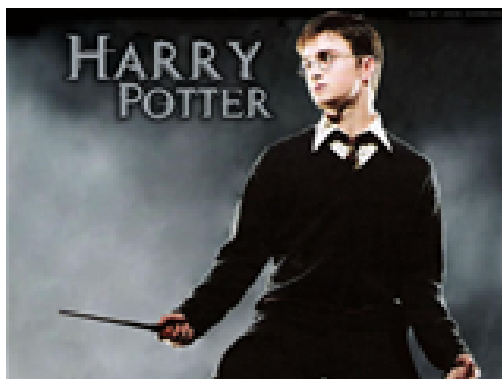
stratum corneum

stratum lucidum

stratum granulosum

stratum spinosum

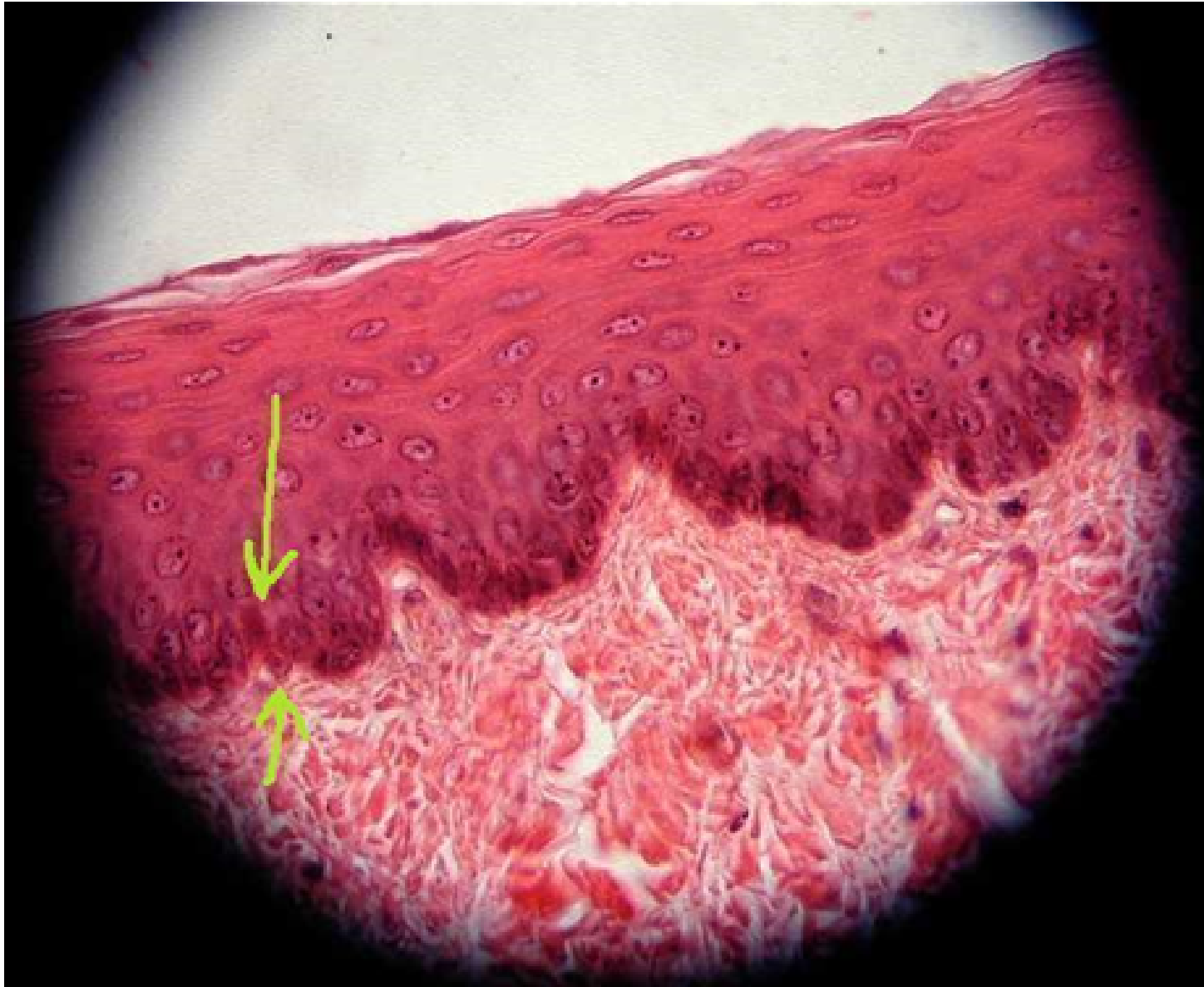
stratum basale



Stratum Basale

- just superior to the dermis (basale = basement layer)
- constantly dividing and producing new cells (that are pushed to the surface every 2-4 weeks)
- as cells move away from dermis they get progressively farther away from blood vessels in the dermis
- because they are not being supplied with nutrients and oxygen they eventually die and slough off

Stratum Basale



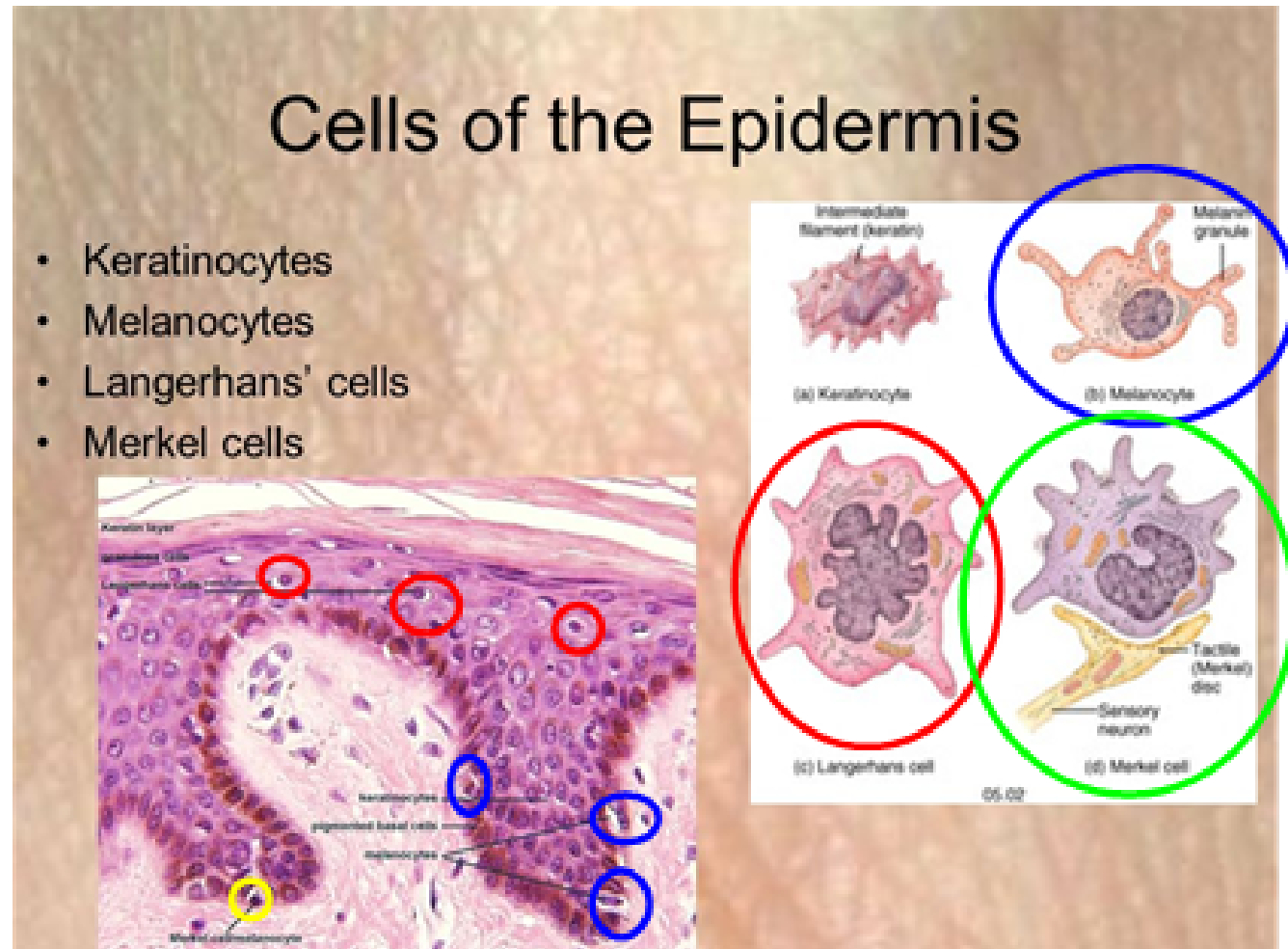
Stratum Basale cont.

There are a few specialized cells that we can find in or very near the basal layer

- Langerhans Cells

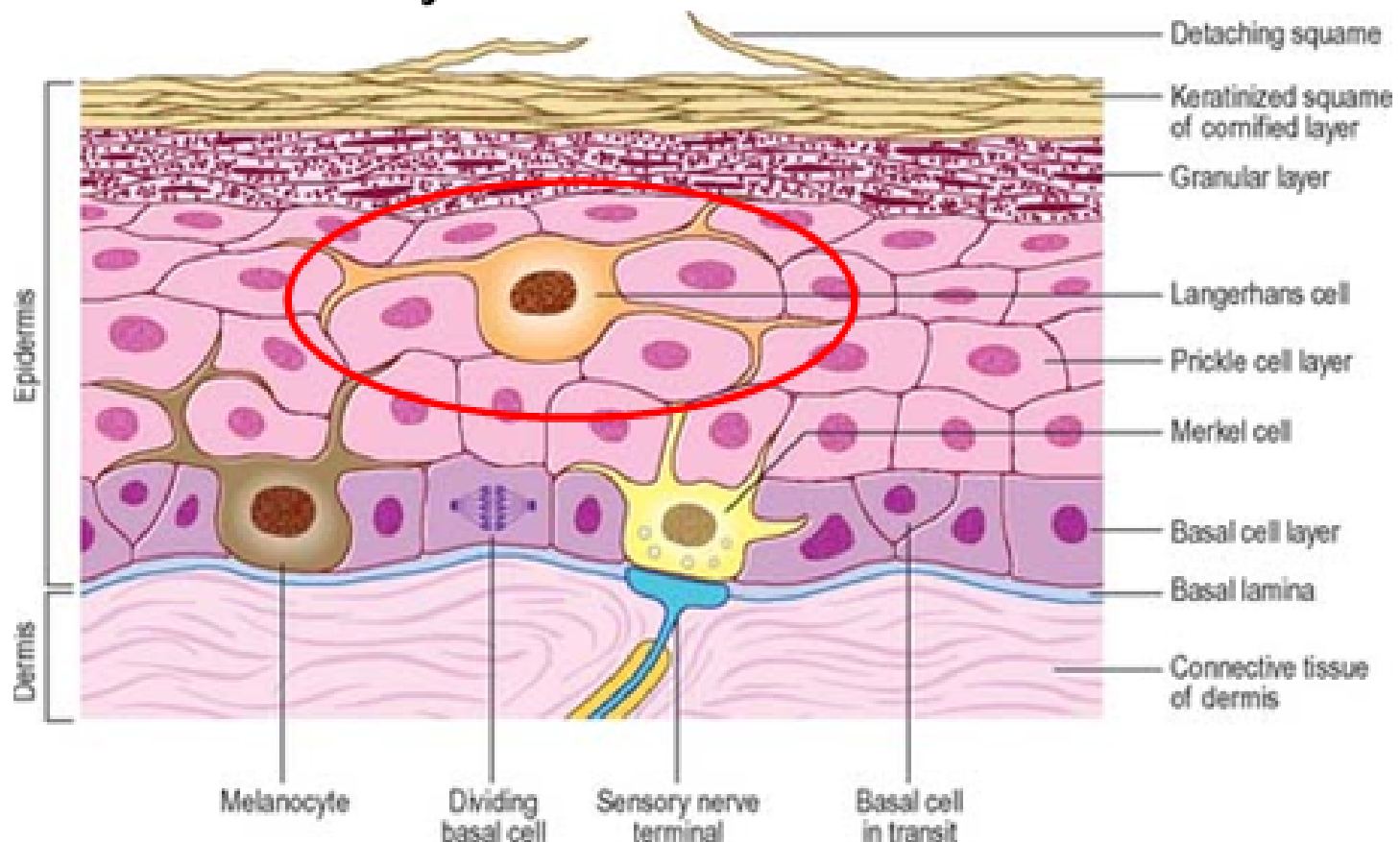
- Melanocytes

- Merkel Cells (Tactile Cells)



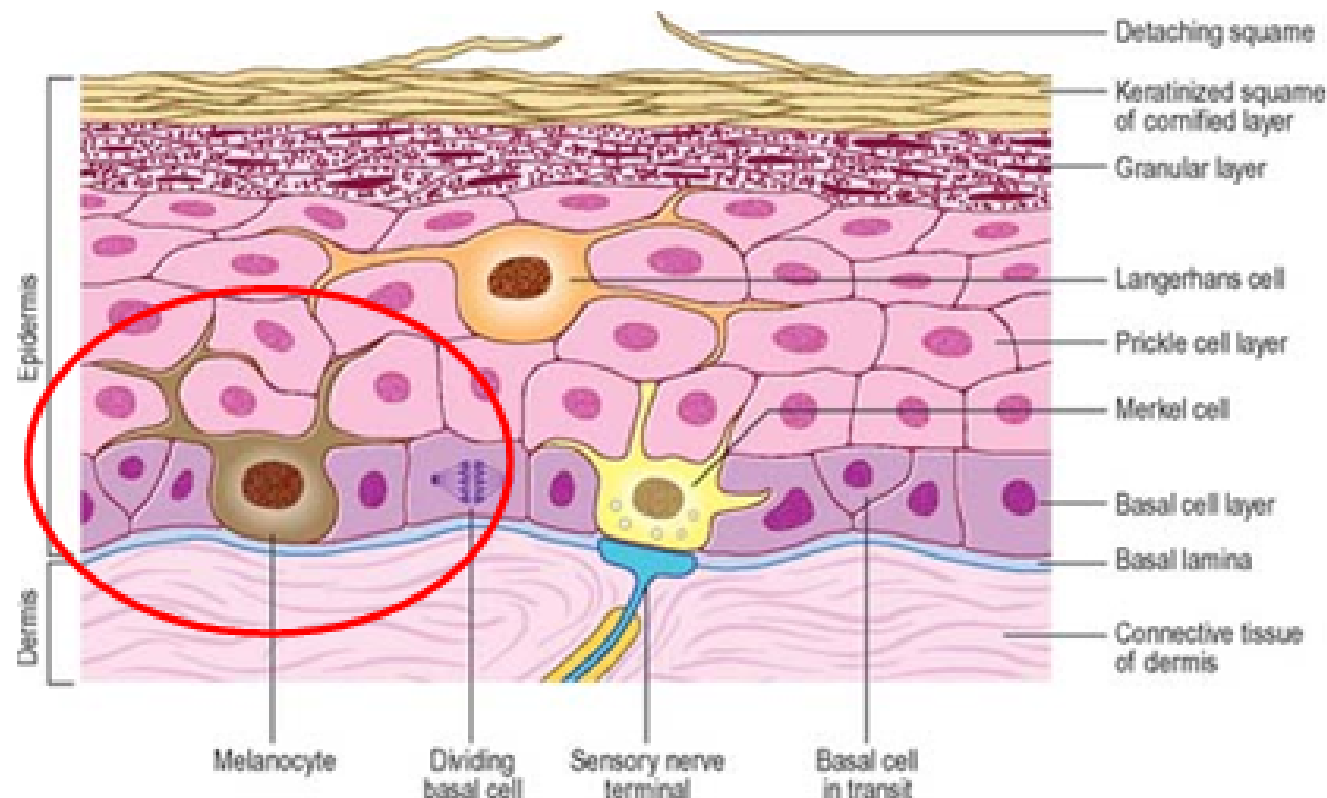
Stratum Basale cont.

- Langerhans cells; macrophages found deep in the epidermis, they phagocytize microbes and then travel to lymphatic organs where they stimulate the immune system to react



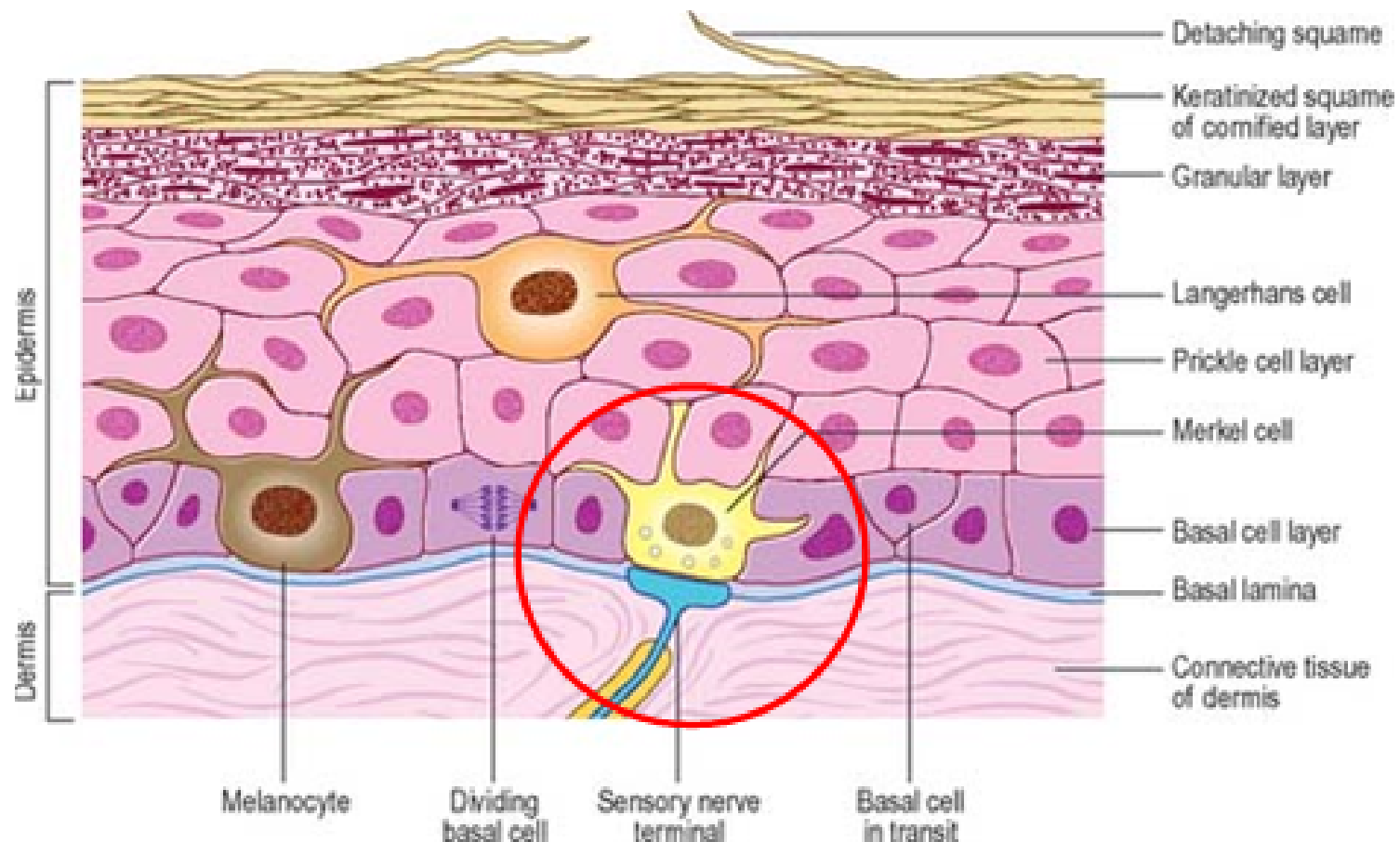
Stratum Basale cont.

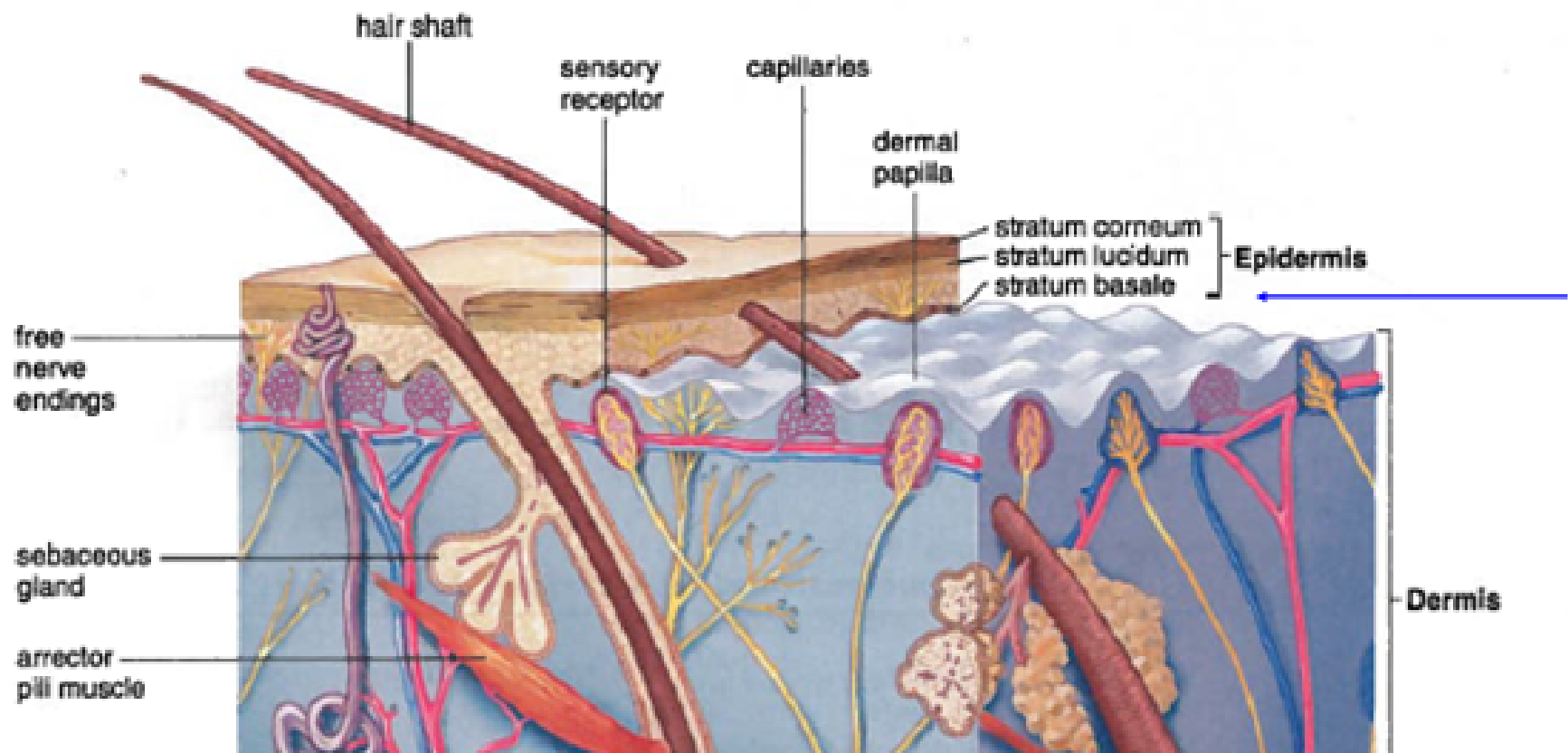
- Melanocytes; located deep in the epidermis, produce melanin (pigment of skin color), amount of melanin determines skin color, (Albanism - lack the ability to produce melanin - When skin is exposed to UV light more melanin is produced as protection)



Stratum Basale cont.

- Free Nerve Endings; supply pain and temperature sensations, "Tactile Cells aka Merkel Cells" signal the brain that an object has touched the skin

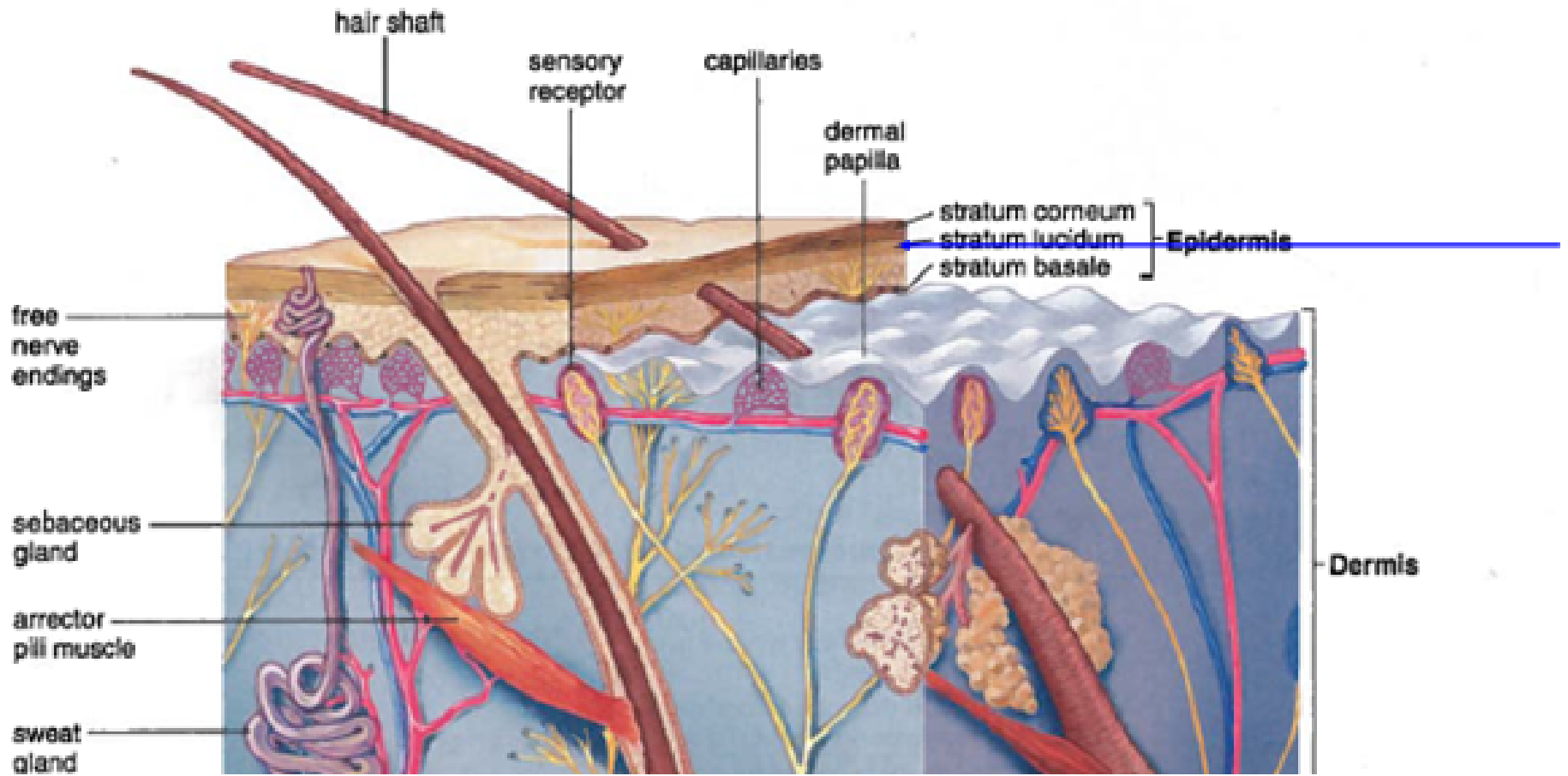




Stratum Lucidum

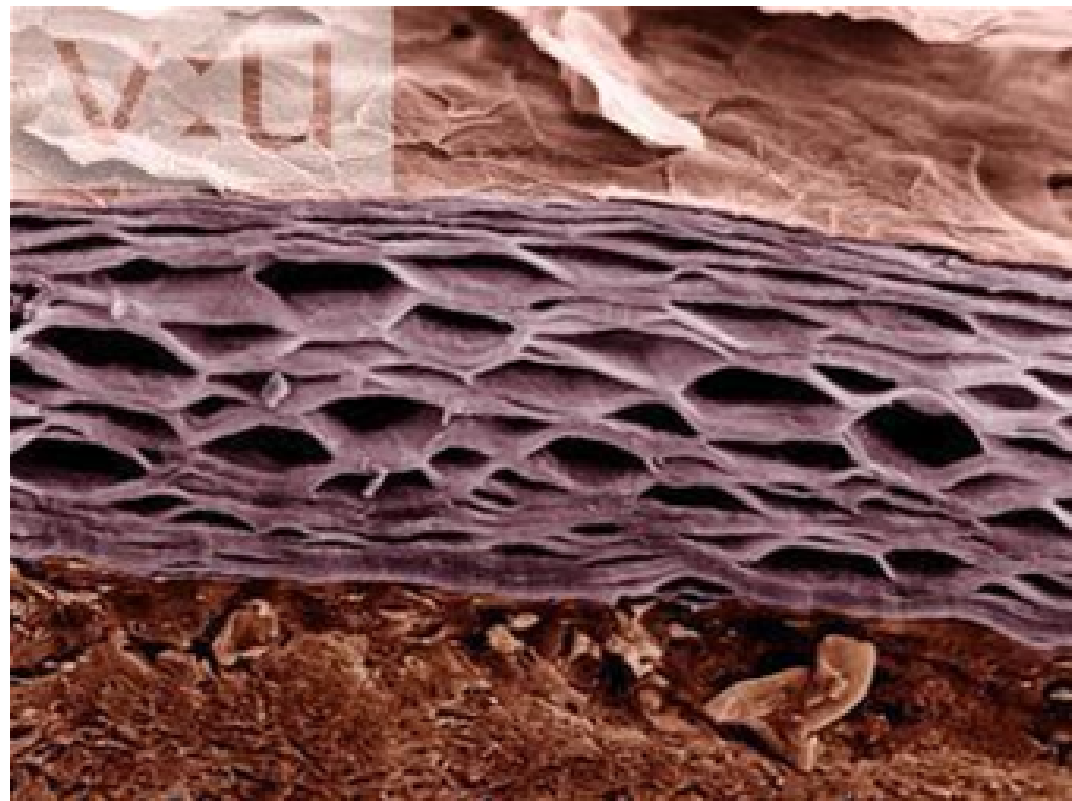
- just deep of the stratum corneum; areas of constant abrasion/calluses
- found only in thick skin (palms of hands, soles of feet, elbows etc)
- provides protection from friction





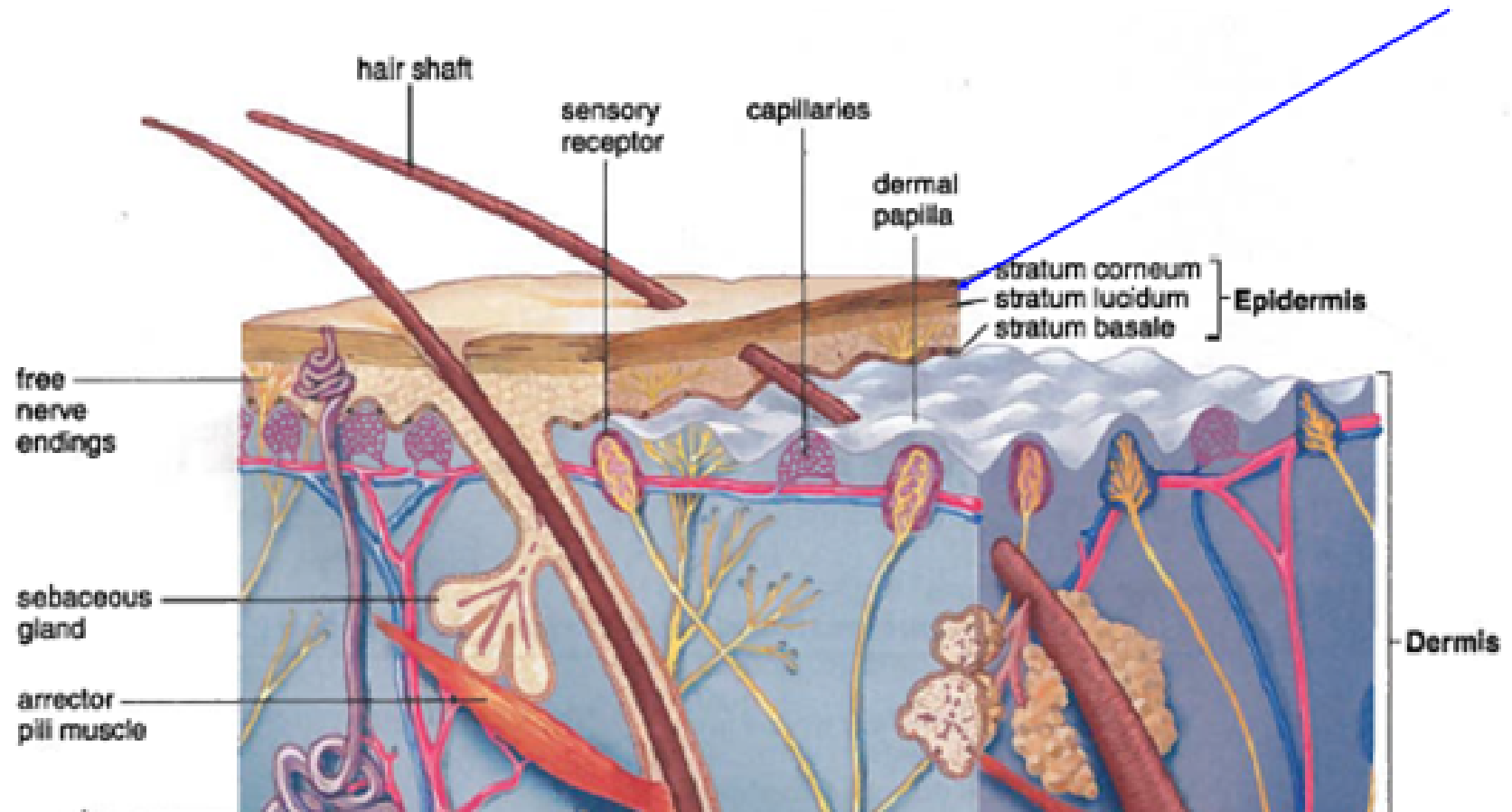
Stratum Corneum

- cells that are pushed toward the surface of the skin become flat and hard forming this tough uppermost layer of the epidermis



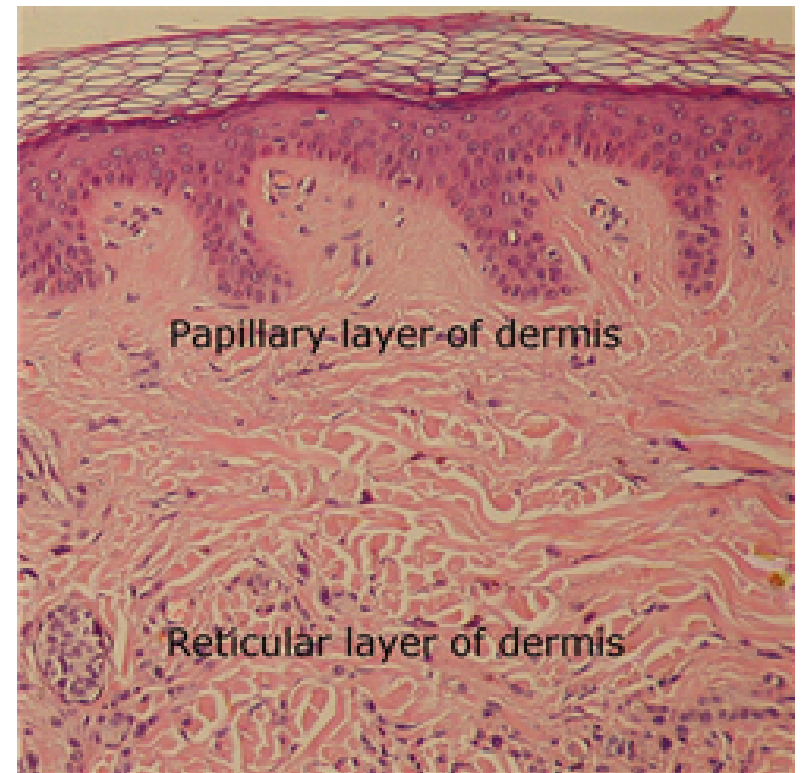
Stratum Corneum cont.

- hardening causes keratinization, the cellular production of a fibrous waterproof protein (keratin)
- protects the body from water loss and gain
- also serves as a mechanical barrier against microbe invasion



Dermis

- deeper and thicker region than the epidermis
- composed of dense irregular connective tissue
- upper layer has fingerlike projections called dermal papillae that project into and anchor the epidermis (produces fingerprints)



Dermis cont.

- contains collagen that are flexible but offer great resistance to overstretching (prevent tearing)
- elastic fibers allow movement of underlying muscles and joints and maintain normal skin tension

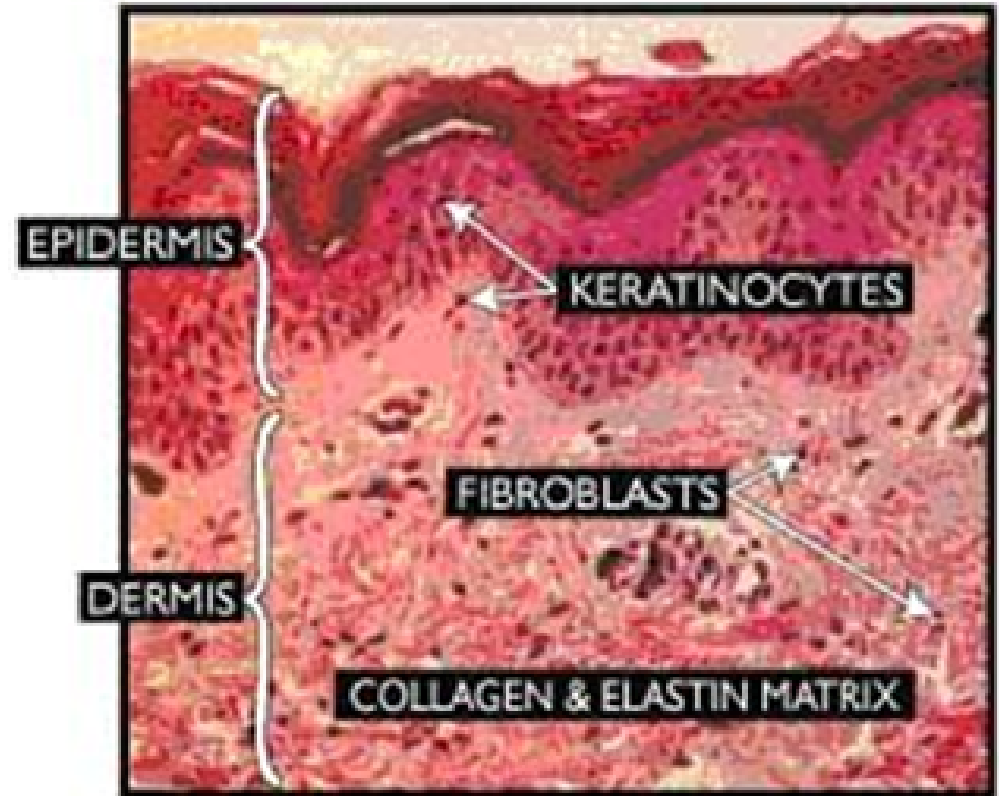


FIGURE 3. Skin Anatomy.

Dermis cont.

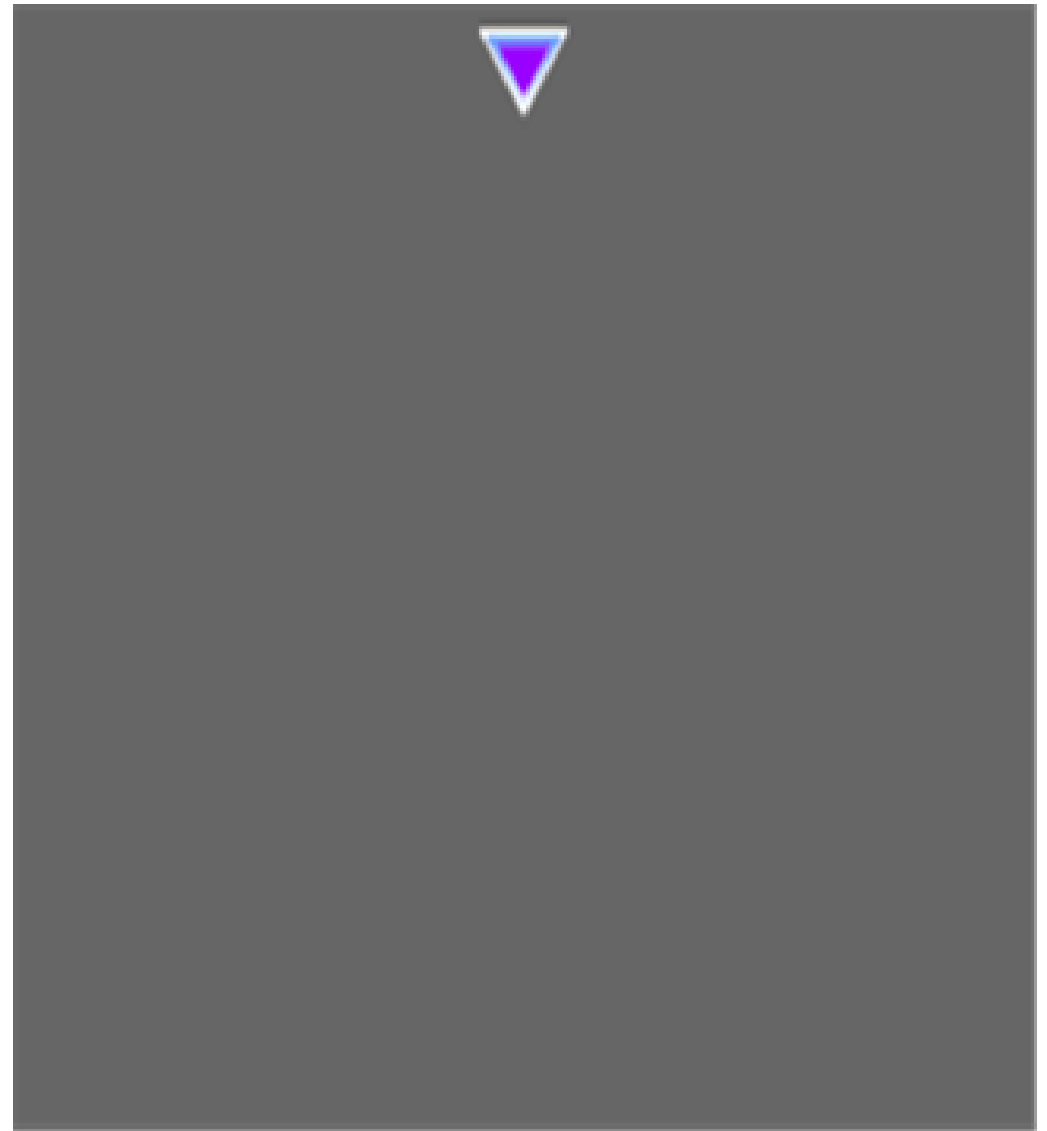
- Contains blood vessels that supply oxygen and nutrients (blushing, pallor/pale, cyanotic/blue)
- Also has numerous sensory nerve fibers that take nerve impulses to and from the accessory structures of the skin



Skin / Peripheral Nerves and Blood Supply in Dermis

Dermis cont.

- Decubitus ulcers (aka bedsores) result when blood supply to the dermis is blocked by continuous pressure
- Common sites are where bone is closed to skin; sacral and coxal regions, ankle, heel, shoulder and elbow
 - Hard to cure once formed
- Reposition hourly / change wet clothing immediately / pad body areas / massage skin gently to stimulate blood flow



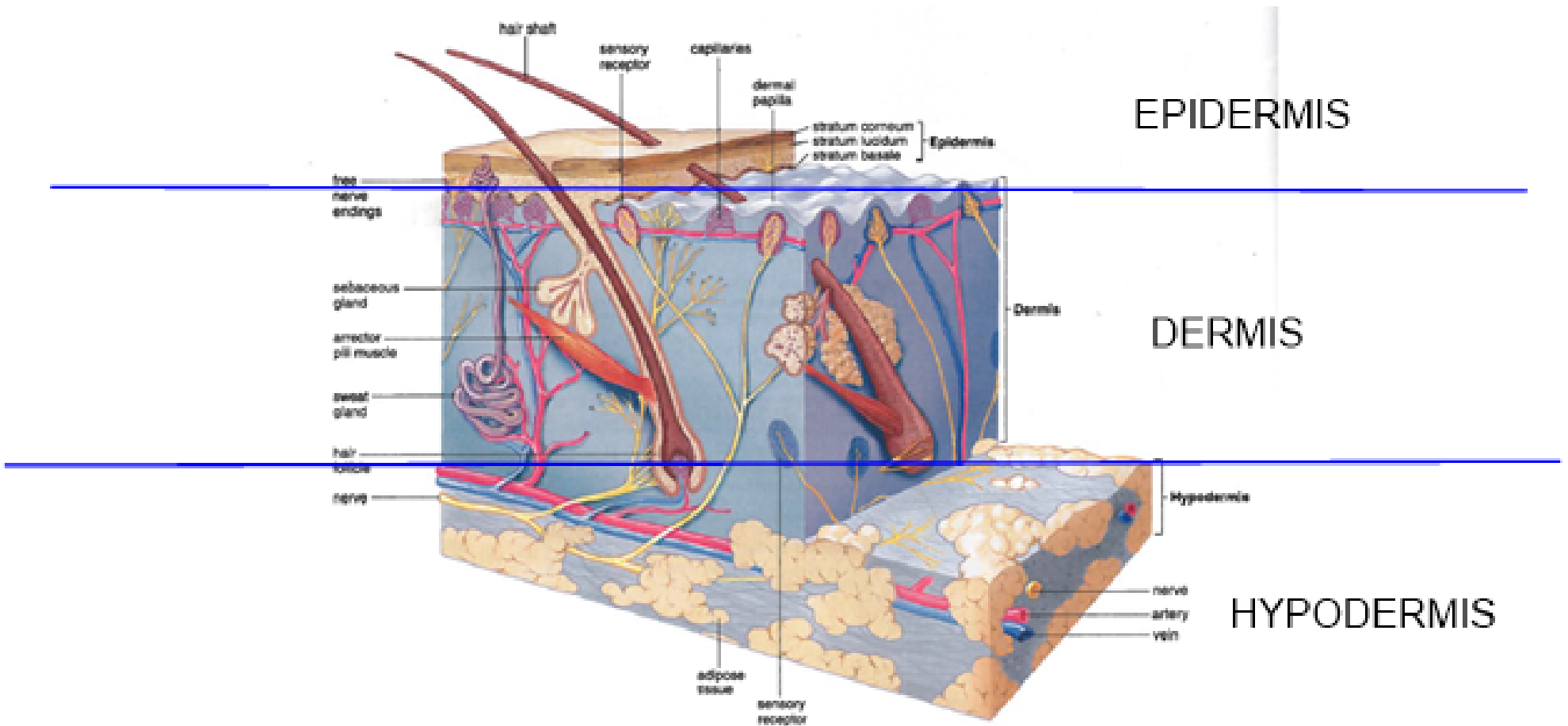


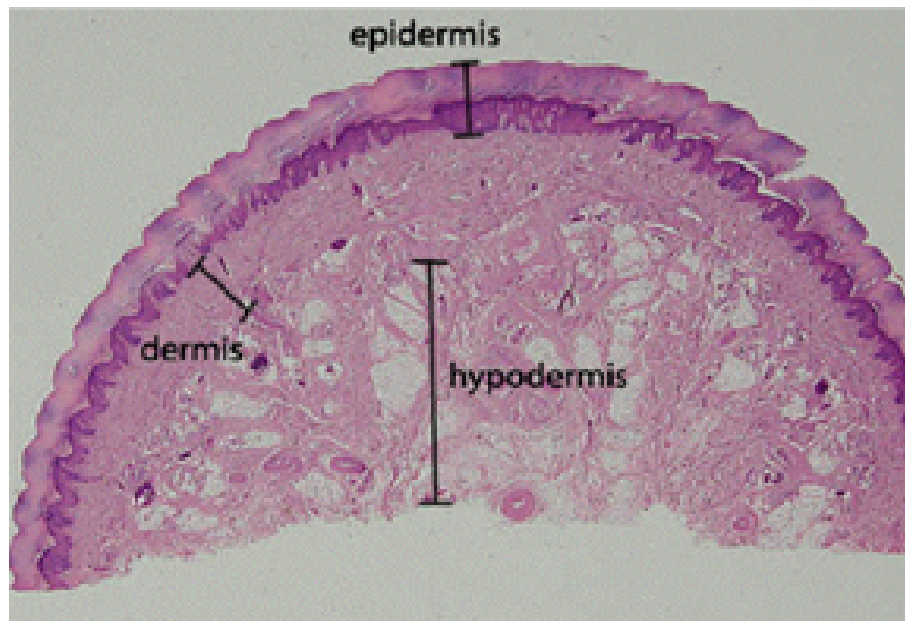
Figure 5.1 Skin anatomy. Skin is composed of two regions: the epidermis and the dermis. The hypodermis, or subcutaneous layer, is located beneath the skin.

The Human Skin Animation Video



Hypodermis

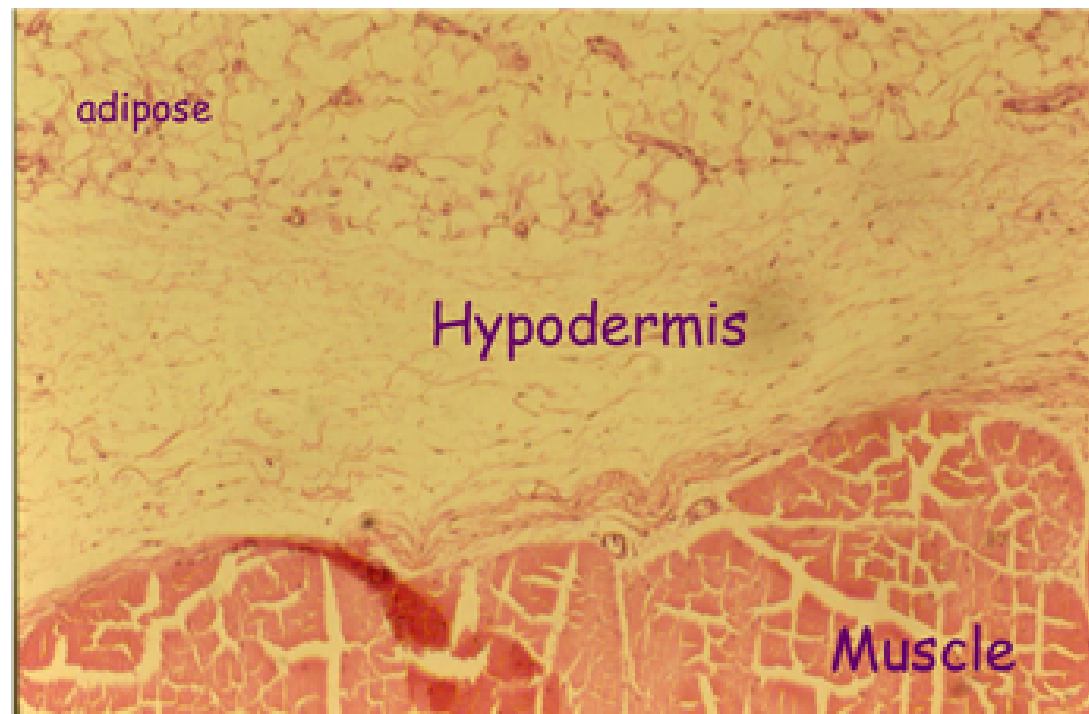
- also called subcutaneous tissue
- lies below the dermis (subcutaneous injection / hypodermic needles etc.)



Hypodermis

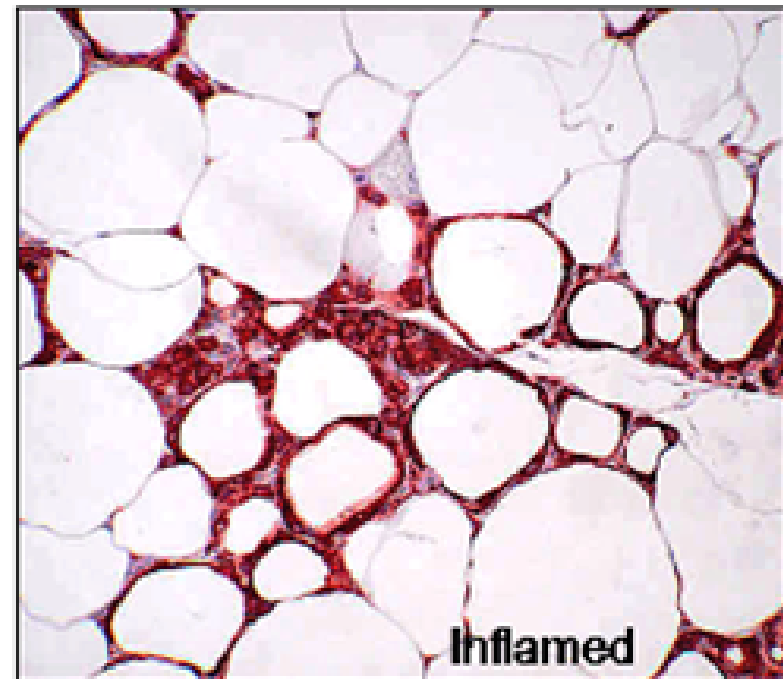
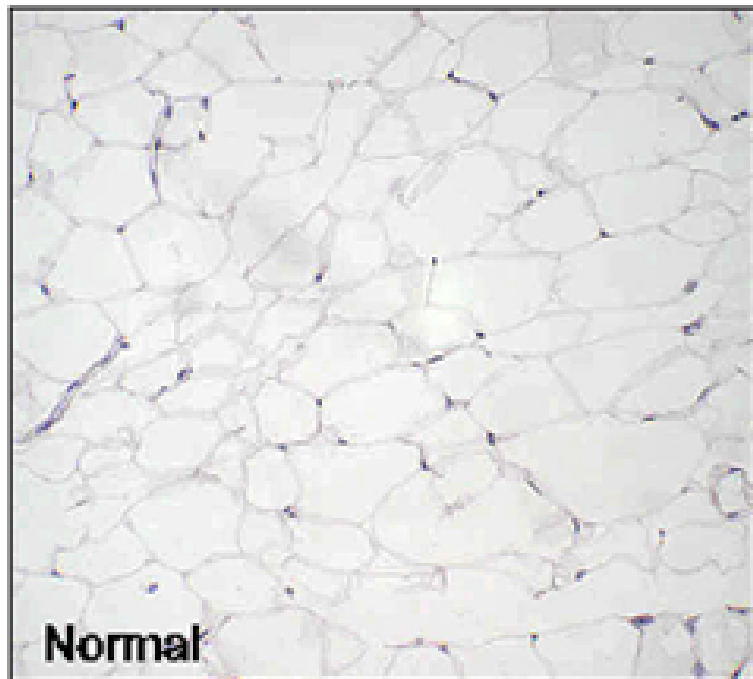
- composed of loose connective tissue including adipose tissue

Integumentary: Hypodermis



Hypodermis

- a well developed hypodermis give the body a rounded appearance and provides protective padding against external assaults
- excessive adipose tissue in the hypodermis layer results in obesity



- The red is infiltration of inflammatory blood cells.

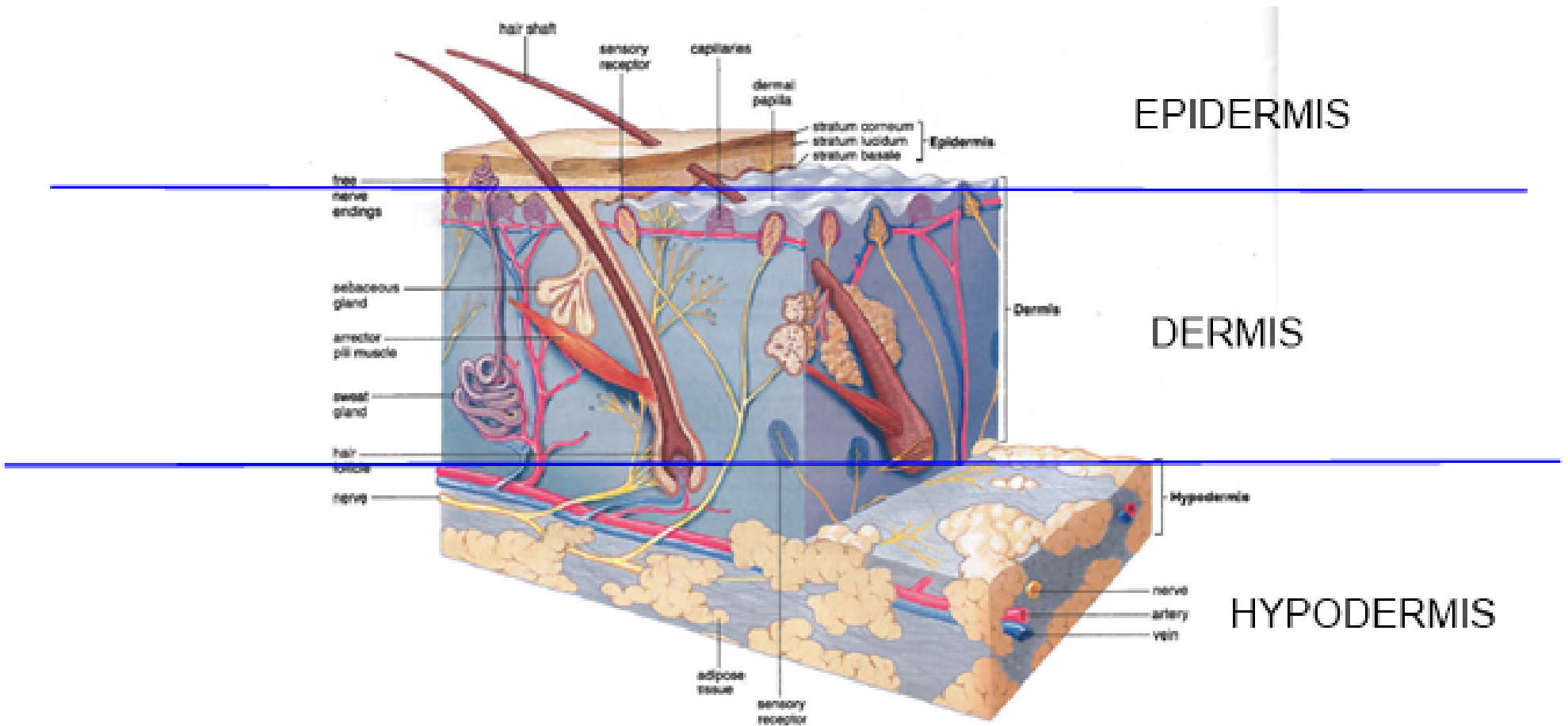
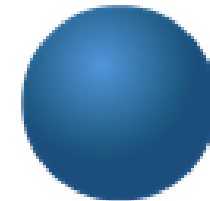


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Assessment:

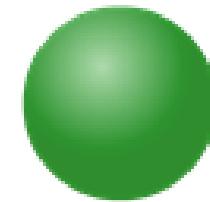
1. Blood vessels can be found in

- a. all three layers of skin
- b. the dermis only
- c. the hypodermis and the dermis



2. Which of the following are white blood cells found in the epidermis that phagocytize microbes and stimulate the immune system?

- a. Merkel Cells
- b. Langerhans Cells
- c. Melanocytes



3. The deepest layer of the epidermis is the

- a. stratum corneum
- b. stratum lucidum
- c. stratum basale

