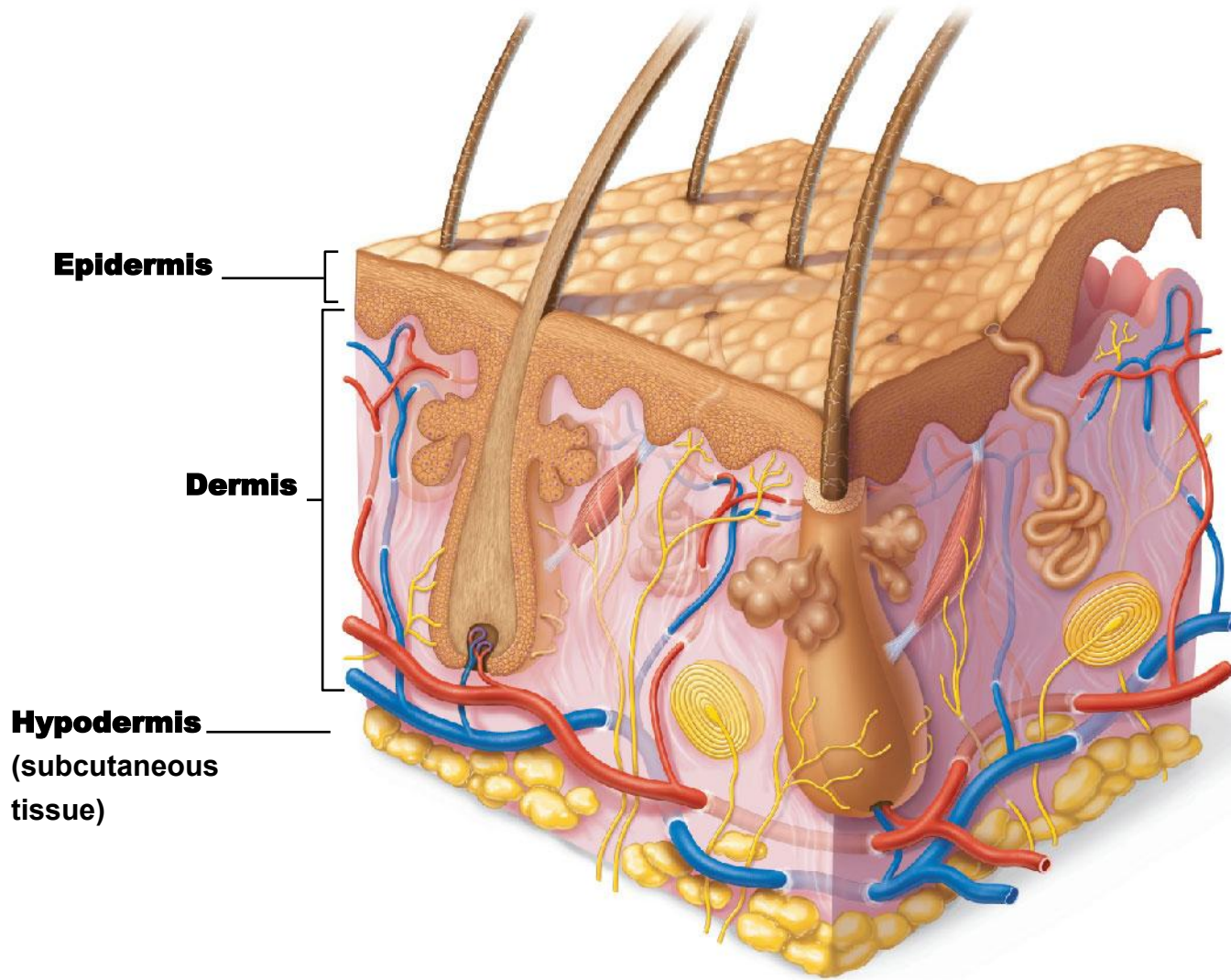


Structure of the Skin

- The skin is composed of two kinds of tissue:
 - **Epidermis**
 - **Dermis**
- **Hypodermis (Subcutaneous layer)**
 - **Deep** to the dermis
 - Composed mostly of **adipose (fat) tissue**
 - **Anchors the skin** to underlying organs
 - Not technically part of the integumentary system
 - Provides a site for **nutrient storage**
 - Serves as a **shock absorber**
 - **Insulates** deeper tissues



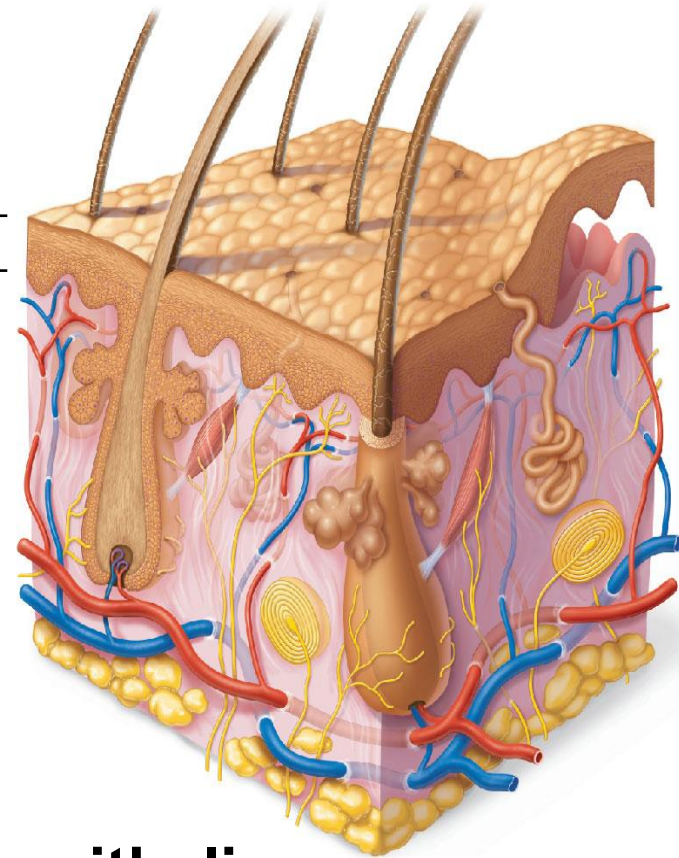
Epidermis

Dermis

Hypodermis
(subcutaneous
tissue)

Epidermis

Epidermis

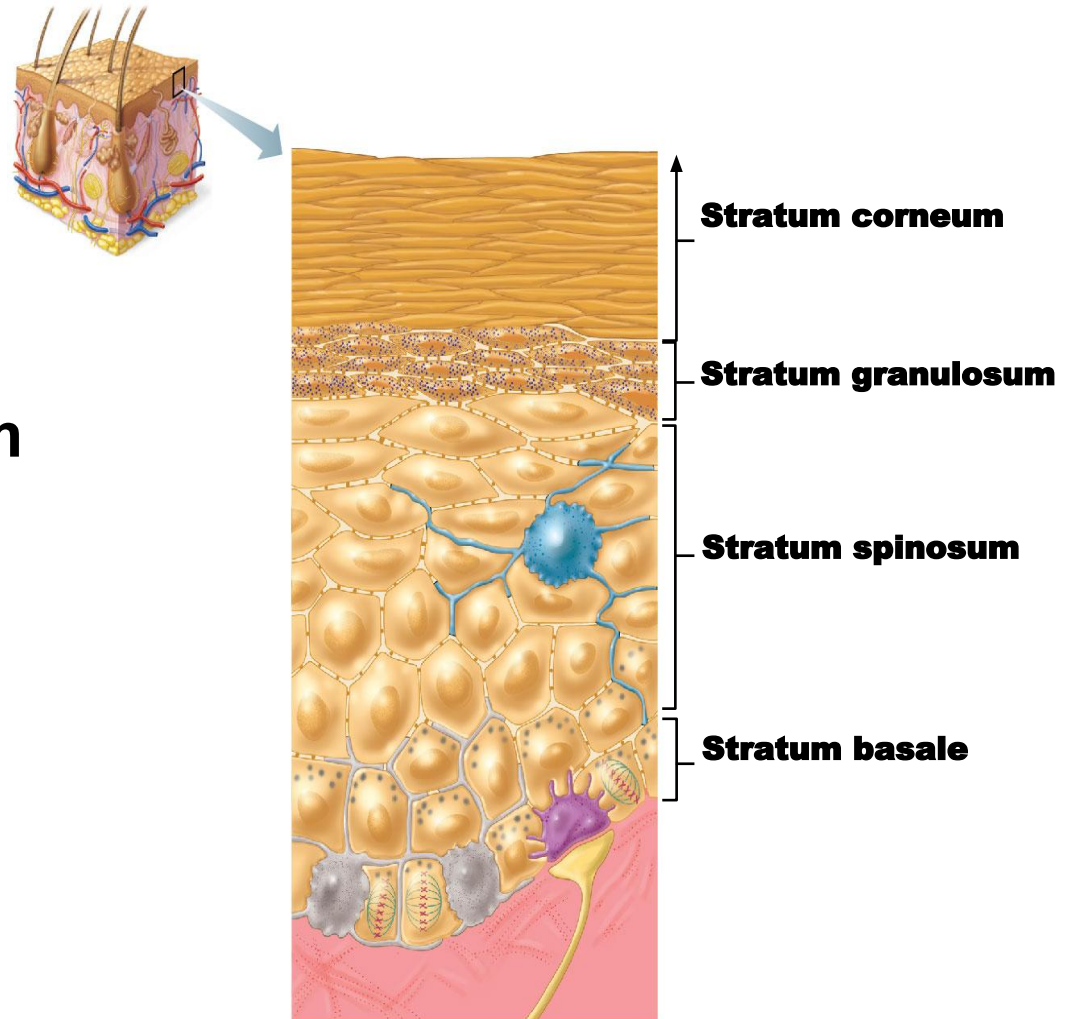


- **Outer** layer of the skin
 - Composed of **stratified squamous epithelium**
 - **Keratinocytes** (the most common cell type) produce a fibrous protein called **keratin**
 - ✓ Makes the epidermis a **hard and tough** protective layer
 - **Avascular** (NO blood supply)

Epidermis

- The epidermis is composed of up to **five layers**, or **strata** (from deepest to most superficial):

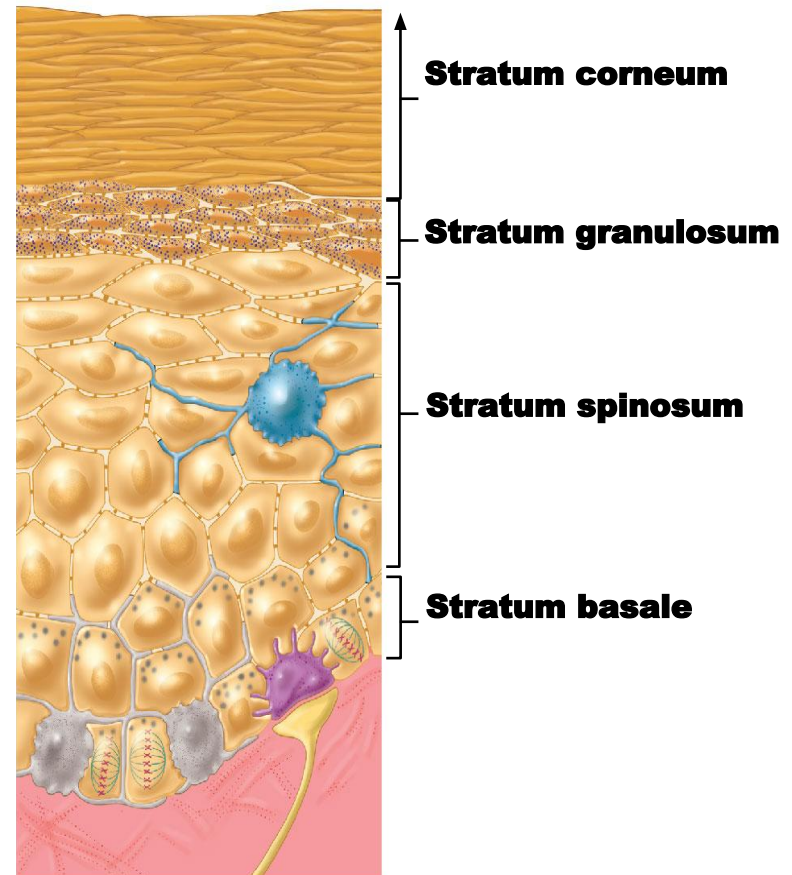
- **Stratum basale**
- **Stratum spinosum**
- **Stratum granulosum**
- **Stratum lucidum**
(not shown)
- **Stratum corneum**



Epidermis

Stratum Basale

- **Deepest layer** of epidermis
 - ✓ Lies next to dermis
 - ✓ **Wavy borderline** with the dermis anchors the two together
- Most adequately **nourished by nutrients** diffusing from the dermis
- Stem cells undergoing **mitosis**
- Daughter cells are **pushed upward** to become the more **superficial** layers



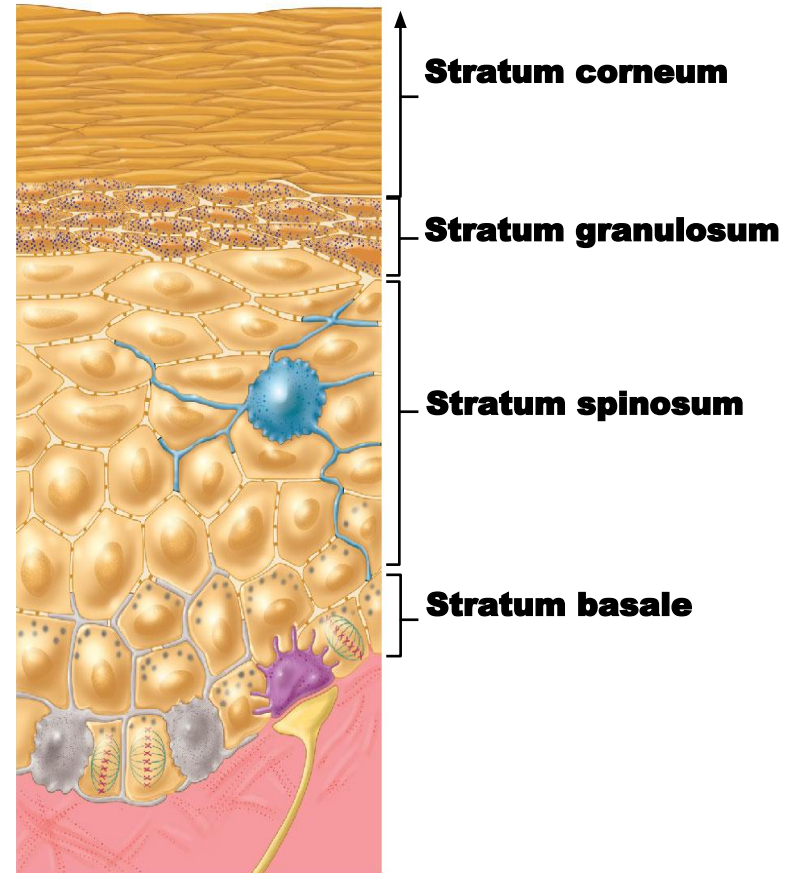
Epidermis

Stratum Spinosum

- Cells contain thick bundles of intermediate filaments made of **pre-keratin**
- Cells become **increasingly flatter** and **more keratinized**

Stratum Granulosum

- Cells are **flattened**
- Organelles are **deteriorating**
- Cytoplasm full of **melanin granules**



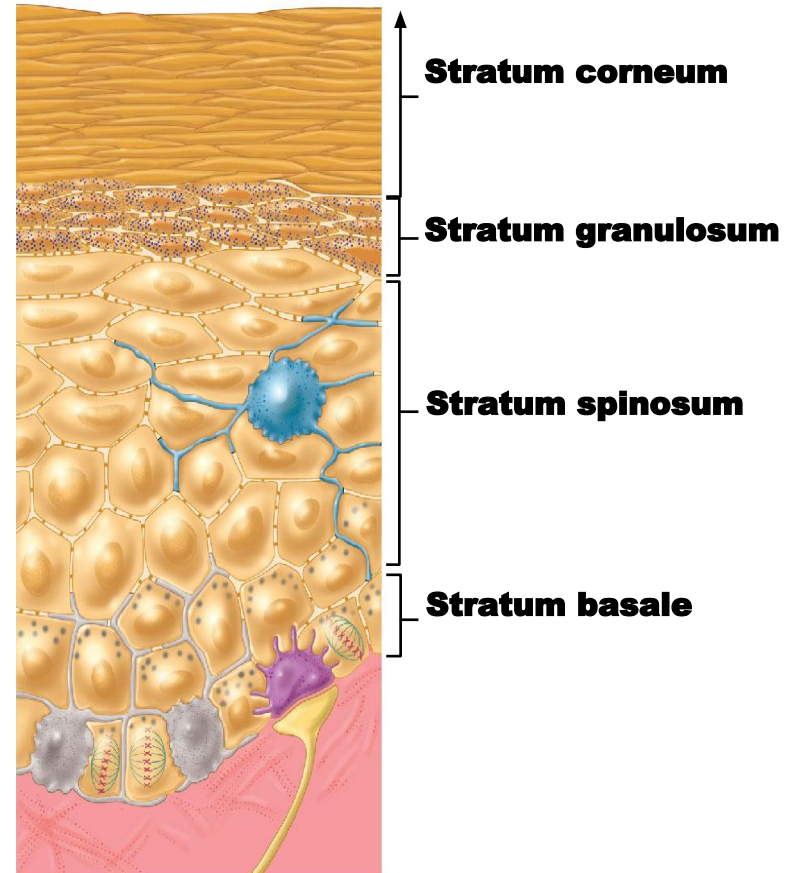
Epidermis

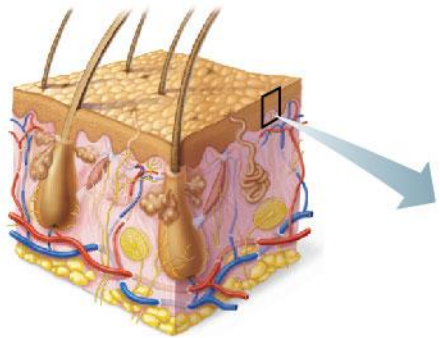
Stratum Lucidum

- Formed from **dead cells** of the deeper strata
- Occurs **ONLY** in thick, hairless skin of the palms of hands and soles of feet

Stratum Corneum

- **20-30 cell layers thick**
- Shingle-like **dead cells** are **filled with keratin**
- Glycolipids in extracellular space make skin **water resistant**





Stratum corneum

Stratum granulosum

Stratum spinosum

Stratum basale

Dermis

Keratinocytes

Desmosomes

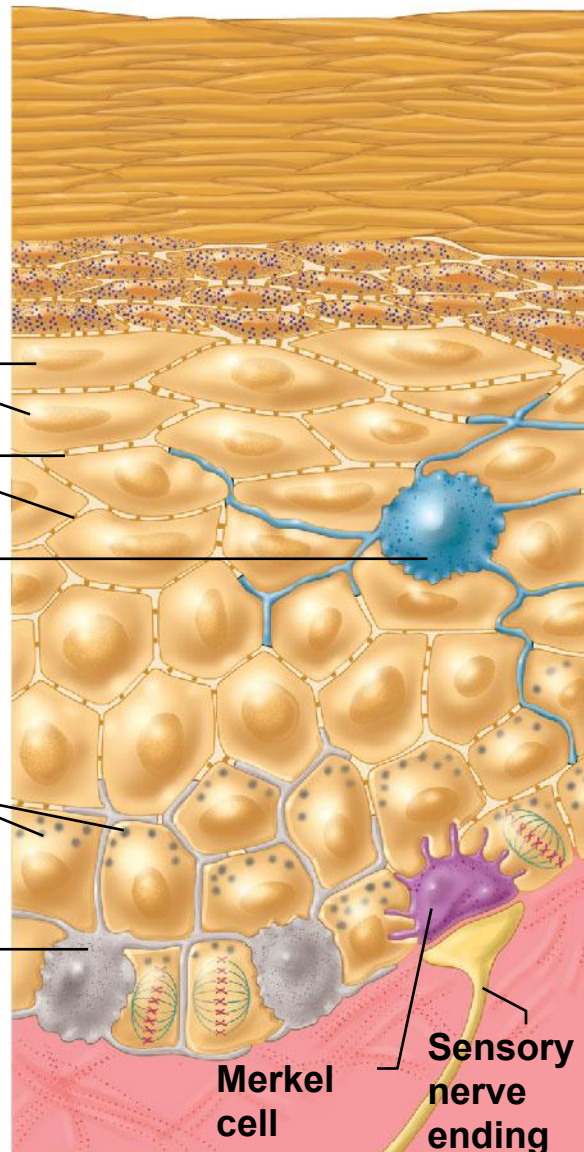
**Epidermal
dendritic cell**

**Melanin
granules**

Melanocyte

**Merkel
cell**

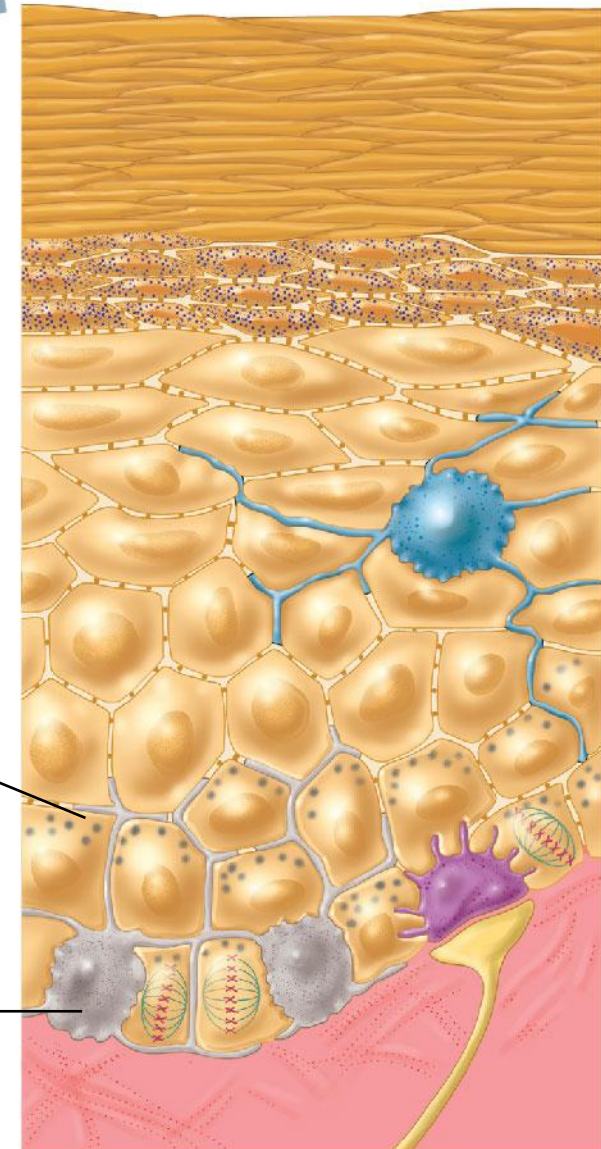
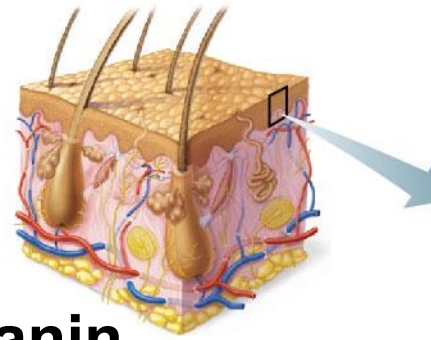
**Sensory
nerve
ending**



Epidermal Cells

- **Melanocytes**

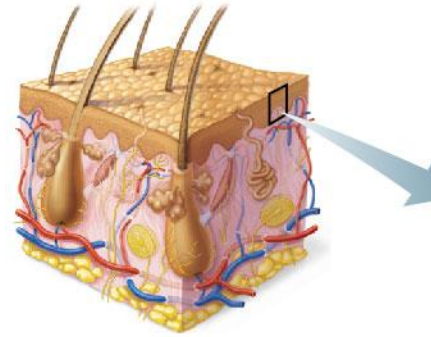
- Produce **pigment melanin**
- Mostly found in the **stratum basale** of the epidermis
- Melanin accumulates in **membrane-bound granules** called melanosomes
- Amount of melanin produced **depends upon genetics and exposure to sunlight**



Melanin granules

Melanocyte

Epidermal Cells



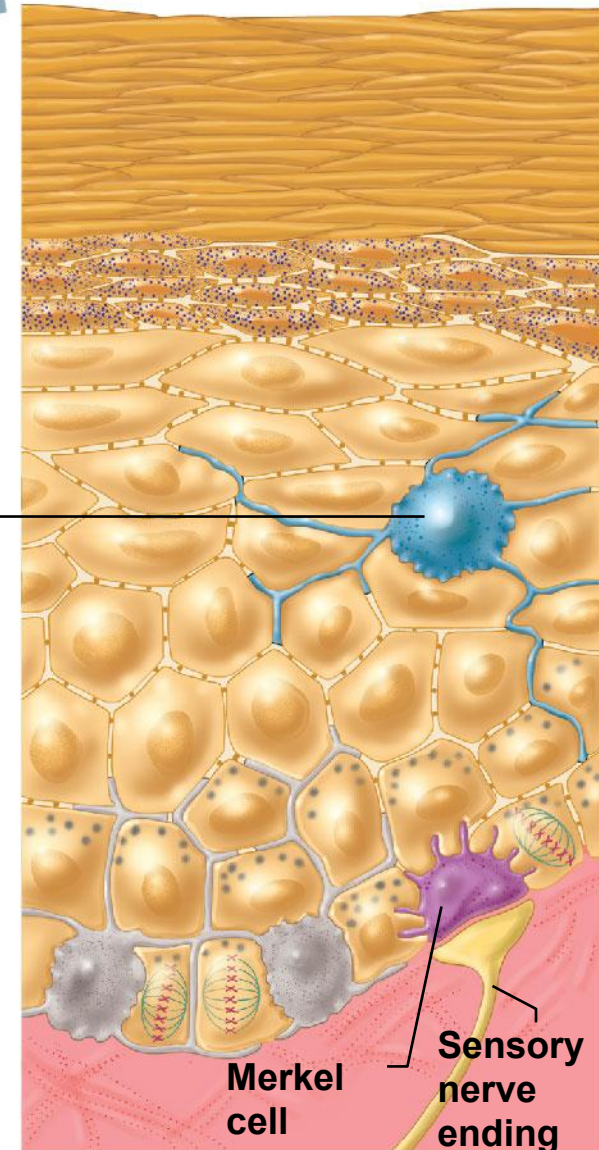
- **Epidermal Dendritic Cells**

- **Alert and activate immune cells** to a threat (bacterial or viral invasion)

- **Merkel Cells**

- Associated with **sensory nerve endings**
- Serve as **touch receptors**

Epidermal
Dendritic Cell

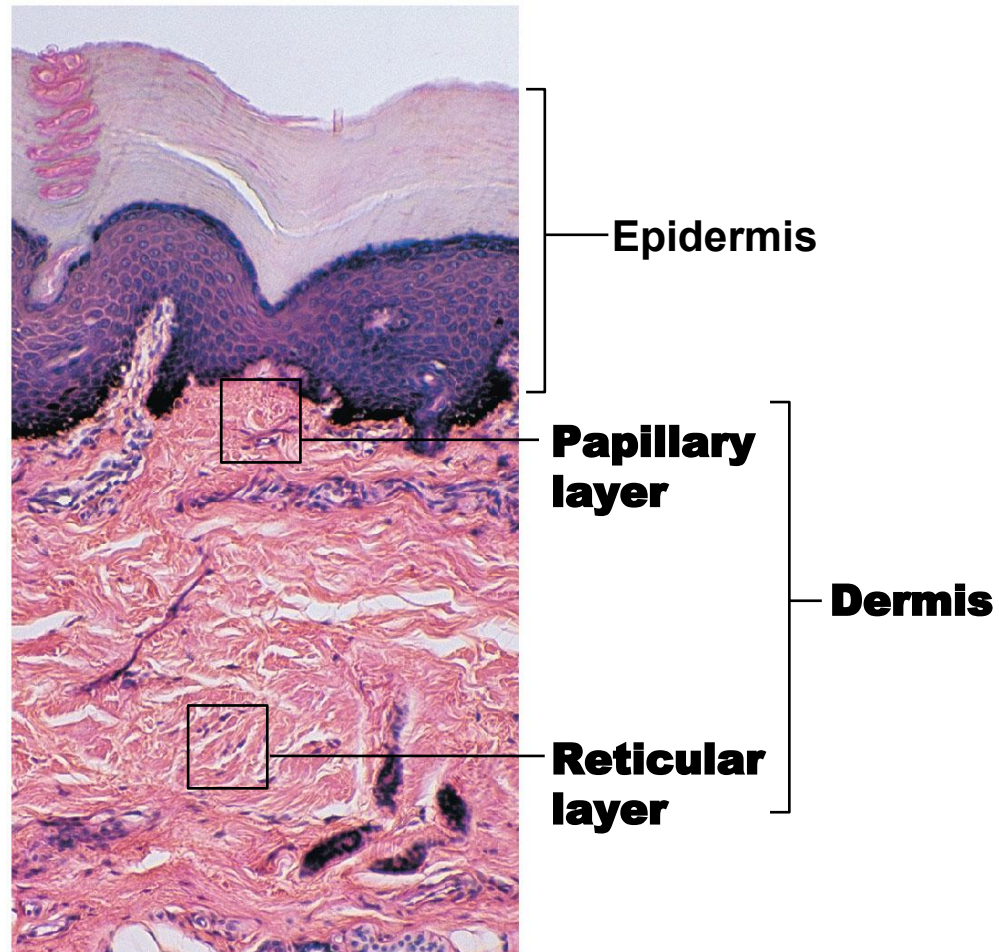


Merkel
cell

Sensory
nerve
ending

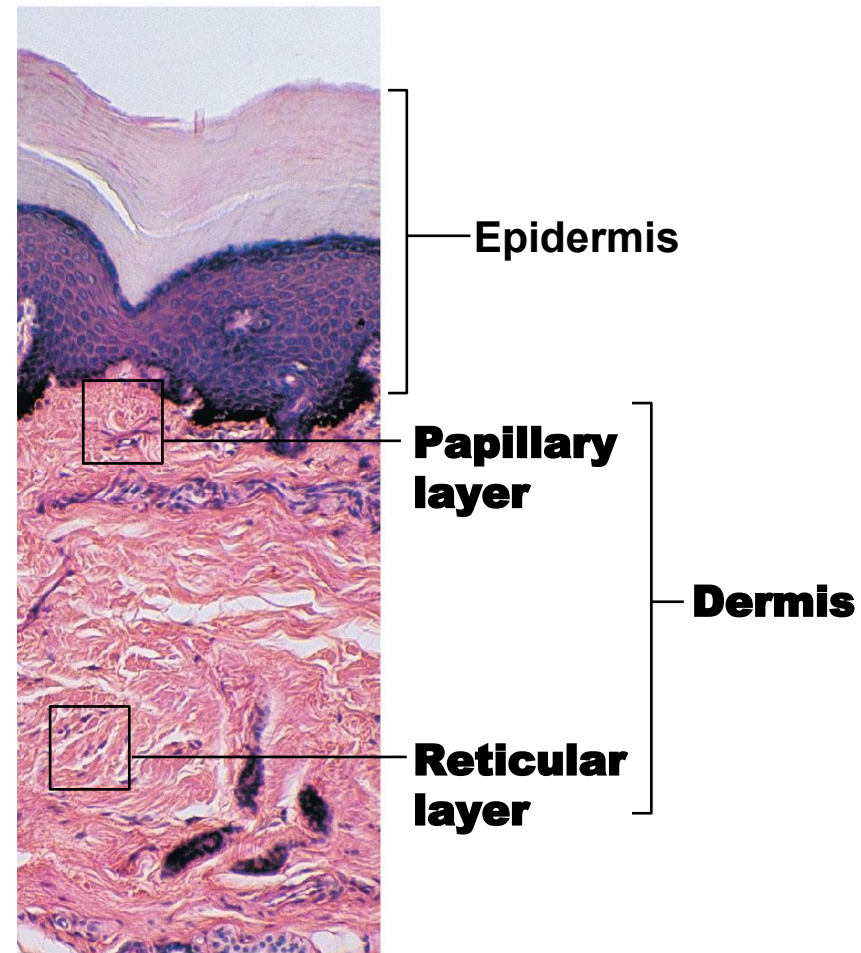
Dermis

- **Underlies** the epidermis
- Two layers of connective tissue
 - **Papillary Layer**
 - ✓ **Loose areolar** connective tissue
 - **Reticular Layer**
 - ✓ **Dense irregular** connective tissue



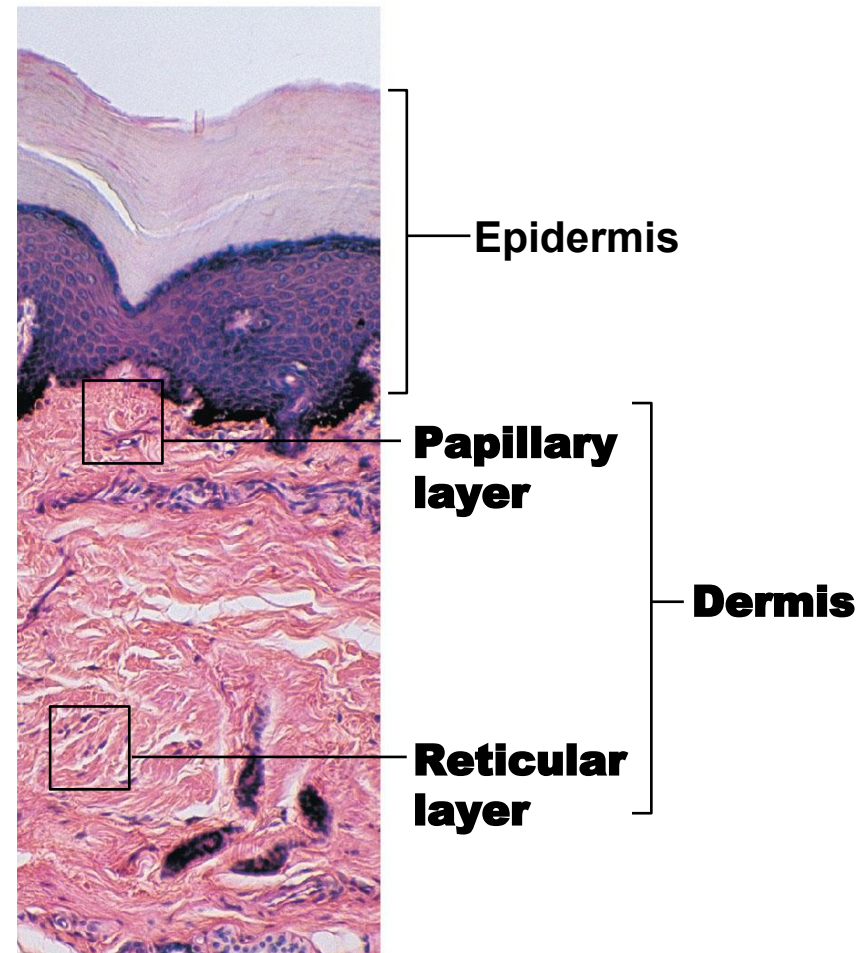
Dermis

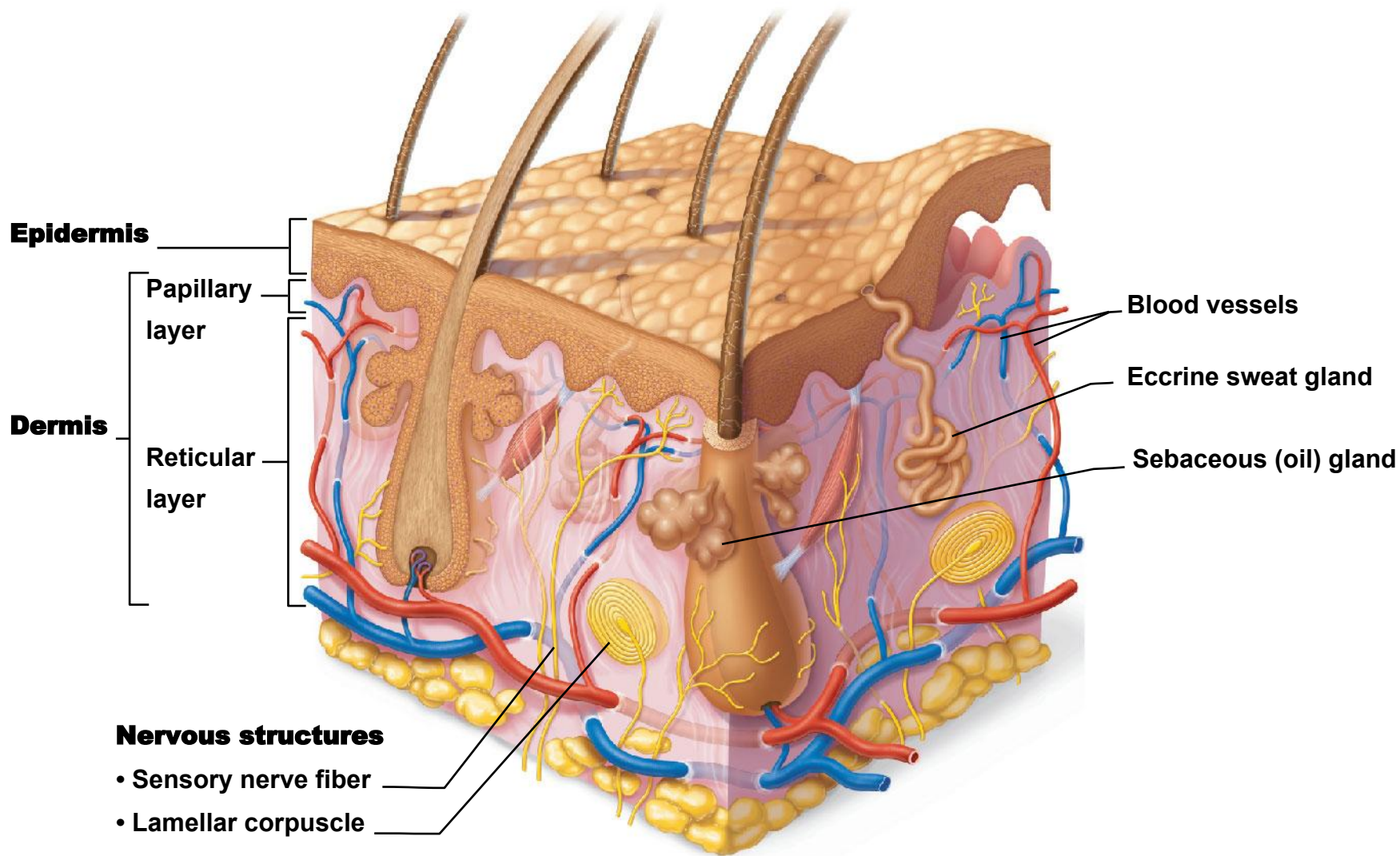
- Papillary layer
 - **Upper dermal region** containing **projections**
 - Many projections **contain capillary loops** which supply nutrients to the epidermis, and others **house pain and touch receptors**
 - On palm and sole surfaces, papillae **increase friction and gripping ability**
 - **Fingerprints** are identifying films of sweat



Dermis

- Reticular layer
 - **Deepest skin layer**
 - Contains **blood vessels**
 - Contains **sweat and oil glands**
 - Contains **deep pressure receptors** (lamellar corpuscles)





Dermis

- Other dermal features
 - **Cutaneous sensory receptors**
 - ✓ Touch, pressure, temperature, and pain receptors provide information about the external environment
 - **Phagocytes**
 - ✓ Prevent microbes from penetrating into deeper tissues
 - **Collagen fibers**
 - ✓ Responsible for **skin toughness**
 - ✓ Attract and bind water to keep skin hydrated
 - **Elastic fibers**
 - ✓ Responsible for **skin elasticity**
 - **Blood vessels**
 - ✓ Play a role in **body temperature homeostasis**

Skin Color

- **Three pigments contribute to skin color**
 - **Melanin**
 - ✓ Yellow, reddish brown, or black pigments
 - **Carotene**
 - ✓ Orange-yellow pigment from some vegetables
 - **Hemoglobin**
 - ✓ Red coloring from blood cells in dermal capillaries
 - ✓ **Oxygen content** determines the extent of red coloring
- **Emotions** also influence skin color

Skin Color

- Alterations in skin color signal certain **disease states**:
 - **Cyanosis**
 - ✓ **Blueness**
 - ✓ Due to poor oxygenation of hemoglobin
 - ✓ Possible sign of respiratory or cardiovascular problems
 - **Erythema**
 - ✓ **Redness**
 - ✓ Due to embarrassment, inflammation, hypertension, fever, or allergy
 - **Pallor (blanching)**
 - ✓ **Pale coloring**
 - ✓ Due to emotional stress (such as fear), anemia, low blood pressure, impaired blood flow to an area

Skin Color

- Alterations in skin color signal certain **disease states**:
 - **Jaundice**
 - ✓ **Yellow cast**
 - ✓ Indicates a liver disorder
 - **Bruises**
 - ✓ **Black and blue marks**
 - ✓ Indicates hematomas