



## **HUMAN ANATOMY**

### **Lec. 2**

## **INTEGUMENTARY SYSTEM**

**STAGE 3**

**BY**

**DR. MOHAMMED AL-MURIB**

---

### **Integumentary System**

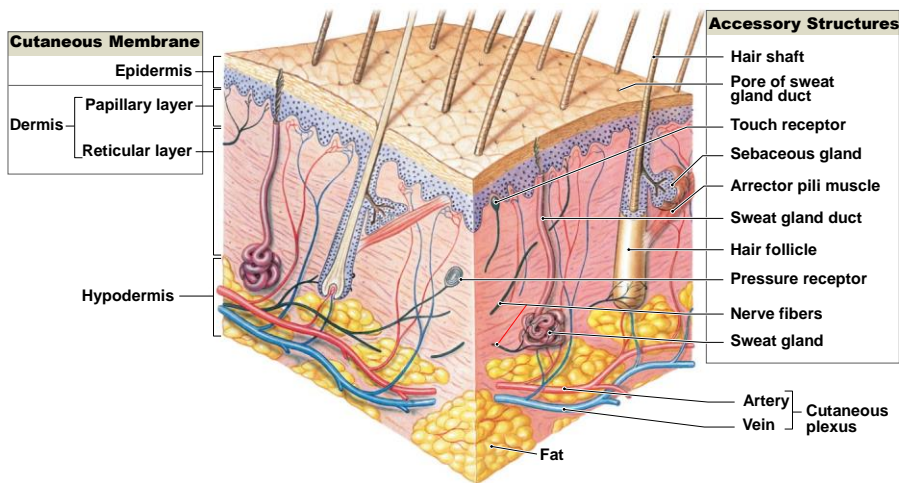
❖ Consists of two major components:

1. Cutaneous membrane (skin)

- Epidermis - superficial
- Dermis – underlying connective tissue.
- Hypodermis (subcutaneous layer) – loose connective tissue under the dermis , Separates the integument from deeper tissues and organs

2. Accessory structures

- Hair, nails, exocrine glands



## Five General Functions of the Integument

### 1. Protection

- Skin covers underlying tissues and prevents fluid loss

### 2. Temperature maintenance

- Skin regulates heat exchange with the environment

### 3. Synthesis and storage of nutrients

- Epidermis synthesizes vitamin D<sub>3</sub>
- Dermis stores lipids in adipose tissue

---

## Functions of the Integument

### 4. Sensory reception

- Receptors for pain, pressure, touch, and temperature detect stimuli and send information to nervous system

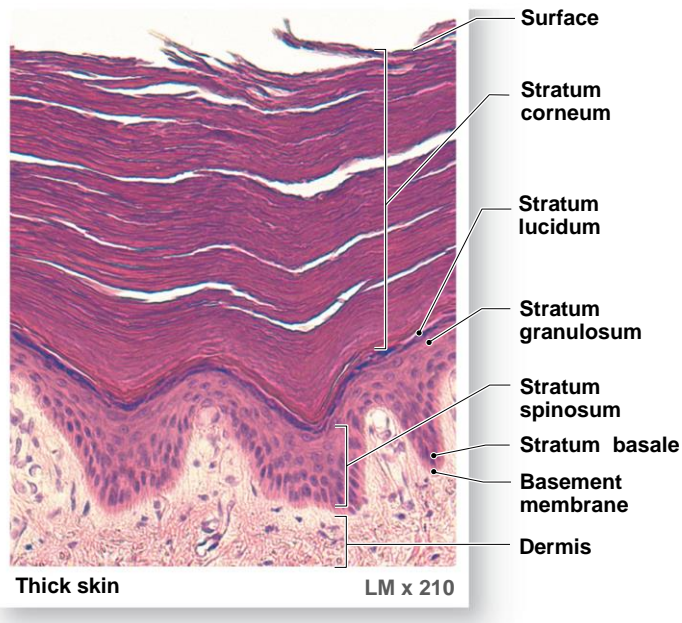
### 5. Excretion and secretion

- Glands excrete salts, water, and organic wastes
- Specialized mammary glands secrete milk

---

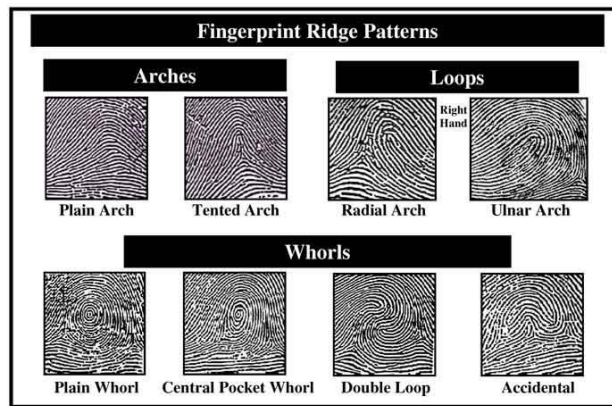
## The Epidermis

- Is stratified squamous epithelium
  - **Thick skin** has five layers (palms, soles)
  - **Thin skin** has four layers (rest of body)
  - Layers are called **strata**, from deep to superficial
    - Stratum basale
    - Three intermediate layers
      - Stratum spinosum, stratum granulosum, and stratum lucidum
    - Stratum corneum



## Stratum Basale

- Contours of skin follow ridge patterns
- Fingerprints – ridge patterns of the fingers



---

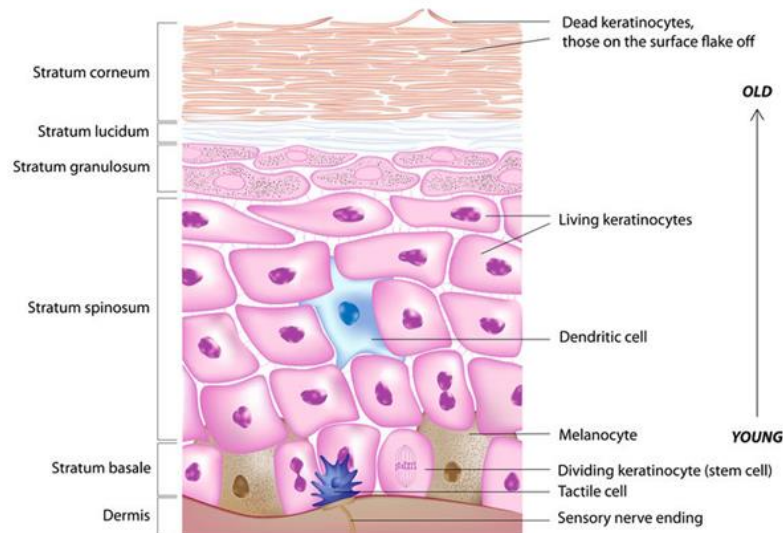
## Stratum Corneum

- At exposed surface of the skin
- Contains 15–30 layers of **keratinized** or **cornified** dead cells
- Takes 7-10 days to move from stratum basale to stratum corneum
- After two weeks in stratum corneum, shed or washed away

---

## Layers of epidermis

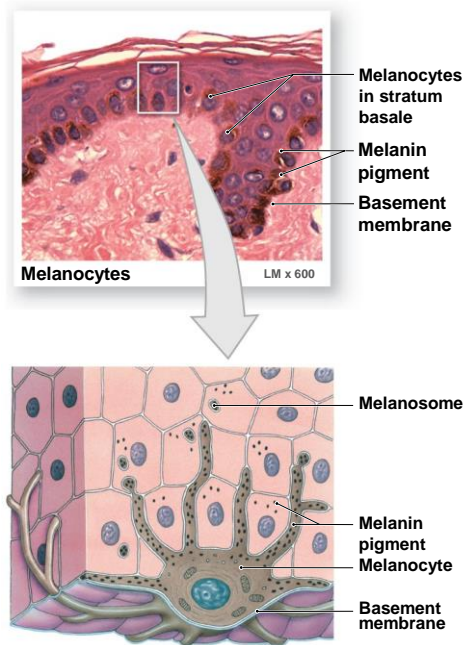
### Structure of the Epidermis



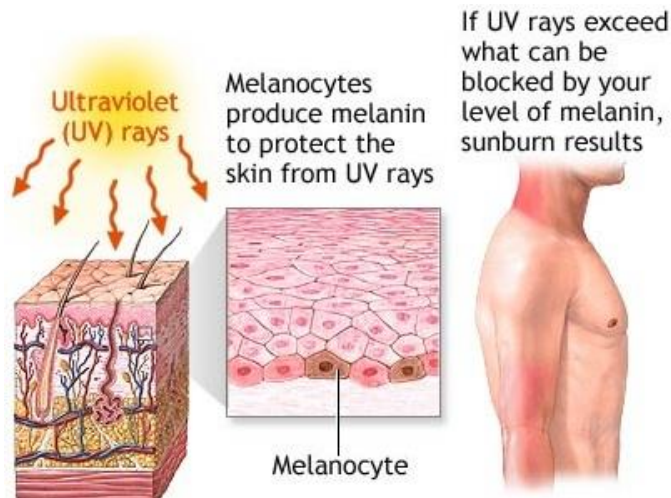
---

## Skin Color

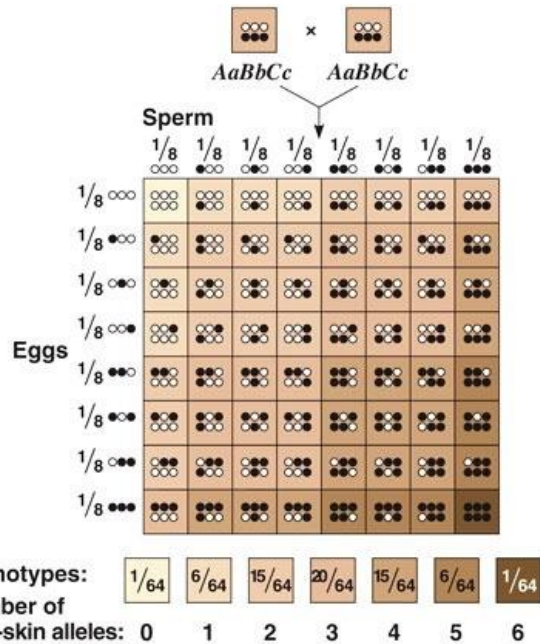
- Role of pigmentation
  - **Carotene** is orange-yellow, accumulates in epidermis, and comes from orange-colored foods
    - Can be converted to vitamin A
  - **Melanin** is brown, yellow-brown, or black, produced by melanocytes near stratum basale cells, absorbs ultraviolet (UV) radiation protecting deeper layers.



## Melanin and sunburn



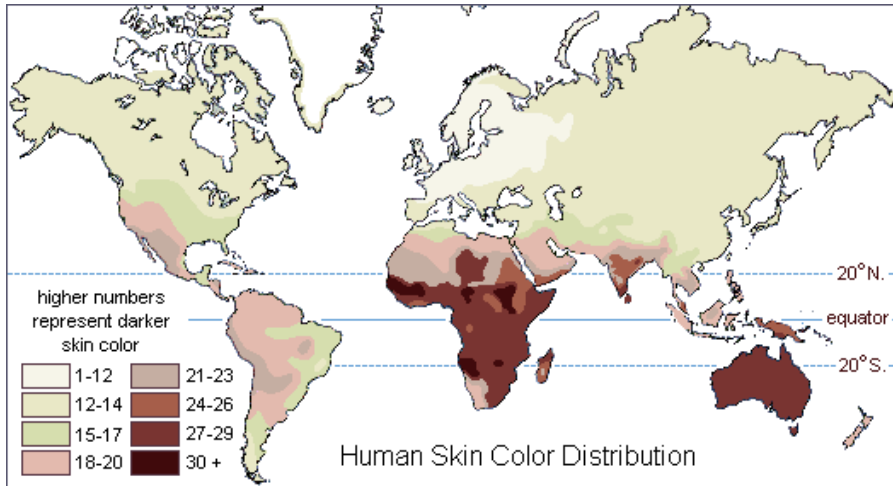
## Melanin





---

## Skin Color



---

## Detrimental Effects of Sunlight on Skin

- Skin cancers
  - **Basal cell carcinoma** is most common
  - **Squamous cell carcinoma** found in more superficial layers

Both of these are treatable in most cases, Surgical removal of tumor is most common treatment.
  - **Malignant melanoma** is most dangerous
  - Avoiding UV radiation by using sunblock can help prevent all three types



Figure 5-4 Skin Cancers.











**a** Basal cell carcinoma



**b** Melanoma

## Skin Cancer

Normal Mole	Melanoma	Sign	Characteristic
		Asymmetry	when half of the mole does not match the other half
		Border	when the border (edges) of the mole are ragged or irregular
		Color	when the color of the mole varies throughout
		Diameter	if the mole's diameter is larger than a pencil's eraser

Photographs Used By Permission: National Cancer Institute

## The Dermis

- Consist of : **Papillary Layer** & **Reticular Layer**

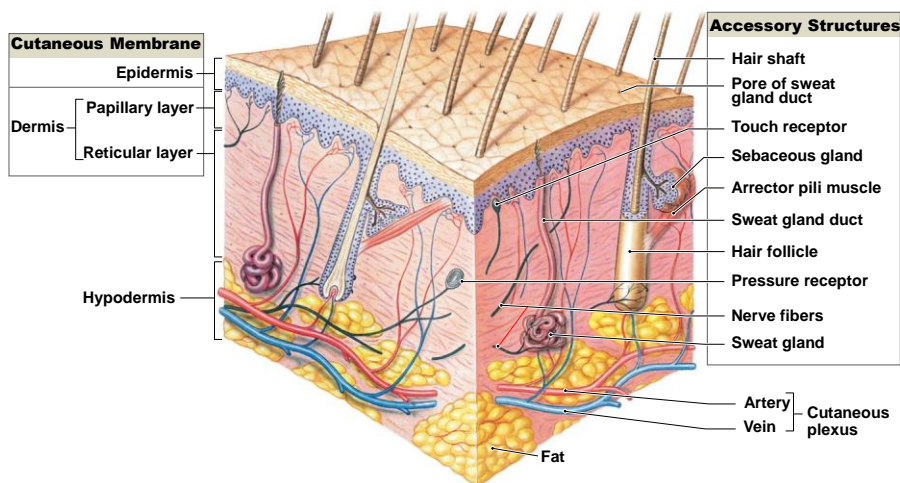
### 1. The Dermal Papillary Layer

- Just deep to the epidermis
- Contains capillaries and nerves supplying the epidermis

### 2. The Dermal Reticular Layer

- Elastic and collagen fibers are present
- Hair follicles and sweat glands derived from epidermis
- Blood vessels, lymphatics, and nerves supply nutrients, eliminate wastes, control secretions, and respond to stimuli

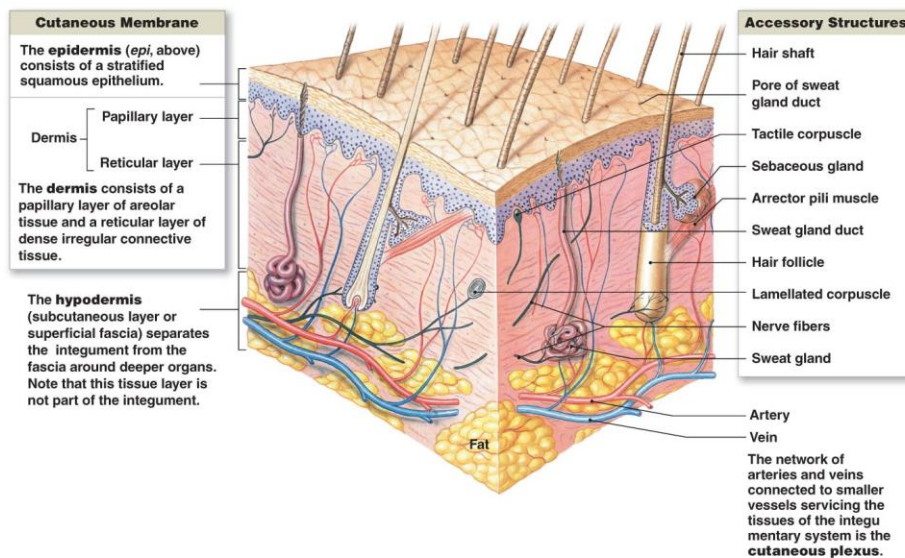
Figure 5-1 The General Structure of the Integumentary System.



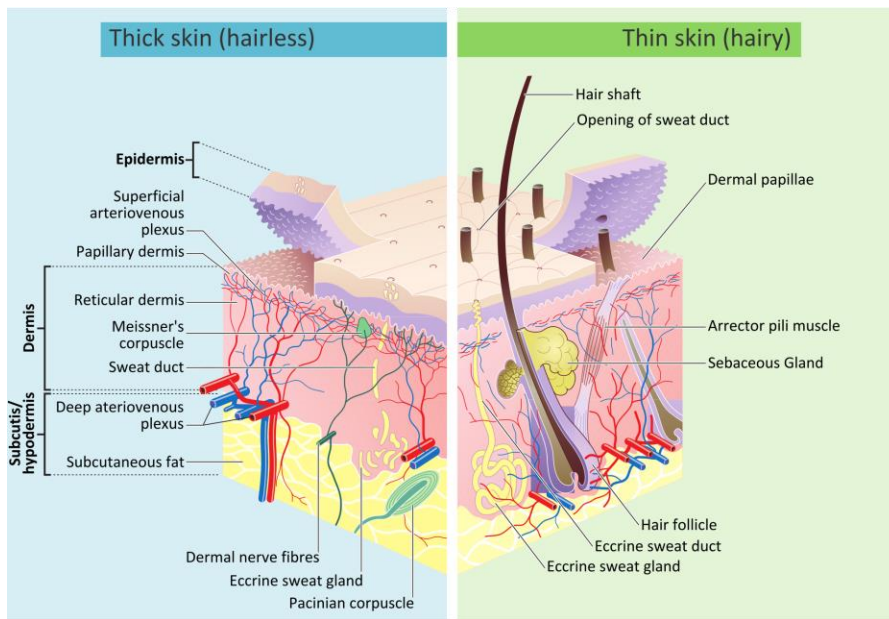
## The Hypodermis

- Also called the subcutaneous layer
  - Deep to the dermis without a clear line separating them
- Made of areolar tissue with many adipose cells
- Fat layers changes as we age
  - Men – neck, upper arms, lower back
  - Women – buttocks, breasts, hips, thighs
  - Both - abdomen

The structure of the skin, or integument, which consists of the cutaneous membrane and accessory structures

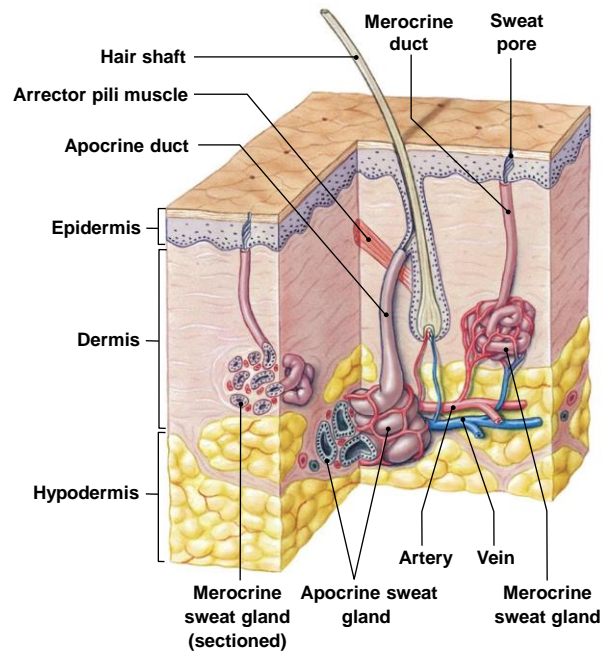


© 2011 Pearson Education, Inc.



## Sweat Glands

- Also called *sudoriferous glands*
- Include two types
  1. *Apocrine sweat glands*
  2. *Merocrine sweat glands*



## Modified Sweat Glands

- Mammary glands
  - Secrete milk
- Ceruminous glands
  - Secrete a waxy substance that combines with sebaceous oils to form earwax

## Nails

- Protect tips of fingers and toes
- Visible **nail body**
  - Made of dense, keratinized cells recessed under surrounding epithelium
- **Nail bed**
  - Deeper level of epithelium covered by nail body
- **Nail root**
  - Where the nail is produced
  - Covered by the **cuticle**
- **Lunula**
  - Pale crescent near root

Figure 5-8 The Structure of a Nail.

