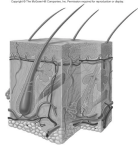


## INTEGUMENTARY SYSTEM

Skin is the largest organ in the body.

- Together with the hair, glands, and nails, it constitutes the *integumentary system*.



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## INTEGUMENTARY SYSTEM

### Components:

Cutaneous membrane

- epidermis
- dermis
- accessory structures

Subcutaneous layer (hypodermis)

- superficial fascia
- subcutaneous fat

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### General Functions:

- Protection
- Excretion
- Maintenance of body temp.
- Synthesis (*Vit. D<sub>3</sub>*)
- Storage
- Detection

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## Epidermis

- Mechanical protection.
- Keeps microorganisms out of the body.

*Stratified squamous epithelium*

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## Layers of the Epidermis

- Stratum Germinativum (or basale)
- Stratum Spinosum
- Stratum Granulosum
- Stratum Lucidum
- Stratum Corneum

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## Thick v. Thin Skin

Refer to the relative thickness of the epidermis, not the integument as a whole.

- Thick skin
  - Has all 5 epithelial strata
  - Found in areas subject to pressure or friction
    - Palms of hands, fingertips, soles of feet
- Thin skin
  - More flexible than thick skin
  - Covers rest of body

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## Keratinization

**Keratinocytes-- produce a protein mixture called *keratin*; responsible for the structural strength and permeability characteristics of the epidermis.**

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## Keratinization

- **The change in shape and chemical composition of cells as they are pushed to the surface.**
- **Cells become filled with keratin**
- **Produce outer protective layer.**
- **Process takes 15-30 days.**

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## Langerhans Cells

*Stratum Spinosum*

**Responsible for stimulating immune defense against:**

1. *Microorganisms penetrating superficial layers.*
2. *Superficial skin cancers.*

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## ***Invisible Perspiration v. Sensible Perspiration***

- **Stratum Corneum**  
**--water-resistant not water-proof.**

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## **The Epidermis & Vitamin D3**

**Limited exposure to sunlight is beneficial.**

*When exposed to sunlight, epidermal cells in the stratum spinosum and stratum germinativum convert a cholesterol-related steroid into cholecalciferol.*

- Liver==>Kidney==> calcitriol**  
**--essential for calcium and phosphorous absorption**

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## **Dermis**

- **Deep part of the skin**
- **Responsible for:**
  - structural strength & flexibility of skin**
  - Epidermis exchanges gases, nutrients, and waste products with blood vessels in the dermis**

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## **Dermis**

**Two major components:**

- **Papillary layer (superficial)**  
--contains capillaries and sensory neurons which supply the skin.  
--forms fingerprints and footprints.

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## **Dermis**

- **Reticular layer (deep)**  
--interwoven meshwork of dense irregular connective tissue (blends w/ papillary layer).  
--also extends into the subcutaneous layer.  
--strong in many directions; forms cleavage lines.

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## **Skin Color**

**Due to the interaction between:**

- **pigment composition and concentration**
- **the dermal blood supply**

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## Skin Color

- **Carotene**  
--orange-yellow color pigment inside epidermal cells.  
--can be converted to Vit. A required for normal maintenance of epithelia and the synthesis of photoreceptor pigments in the eye.

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## Skin Color

- **Melanin**  
--brown, yellow-brown, black pigment produced by *melanocytes*.  
--located in the stratum germinativum  
--protect against harmful affects of sunlight

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## Subcutaneous Layer

- **Indistinct boundary with papillary layer of dermis**
- **loose connective tissue with abundant fat cells**
- **elastic (skin folds)**
- **energy reserve & shock absorption**

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**Lines of Cleavage**

- Collagen and elastic fibers of the skin are arranged in parallel bundles;
- oriented according to stress of normal movement.

**CLINICAL SIGNIFICANCE??**

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**Injury & Repair**

**4 Stages of Repair**

**Scar Tissue:**

- practical limit of the healing process.
- keloid*

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**Accessory Structures**

- Hair follicles
- Sebaceous glands
- Sweat glands
- Nails

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## Sebaceous (Oil) Glands

- *Holocrine* glands (secretory cell becomes swollen with vesicles and ruptures).
- Produce oily lipid that coats hair shafts and the epidermis.
- *Simple branched alveolar glands*.
- Sebaceous follicles.

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## Sudoriferous (Sweat) Glands

- Apocrine
- communicate with hair follicles.  
--produce a sticky, cloudy, and potentially odorous secretion (bacteria may intensify).

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## Sudoriferous (Sweat) Glands

- Merocrine
- smaller and more numerous than apocrine glands....*sensible perspiration*.



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