

The Integumentary System

Chapter 5

Integumentary System

- Structure
 - **Epidermis**
 - **Dermis**
 - **Hypodermis**
- Functions of the skin

The “Birthday Suit”

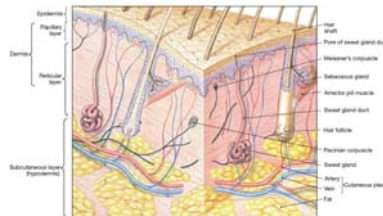
- Combination of 4 main tissues
 - **Epithelial** – outer layer
 - **Connective** – underlies dermis
 - **Smooth Muscle** – goose bumps
 - **Nervous** – sensory receptors
- Structure allows it to carry out many functions
 - Protection, hydration, sensation, hair to color
- Very durable

Functions of the Skin

- Protection
- Temperature regulation
- Sensations
- Storage of chemical compounds
- **Excretion** of wastes
- **Synthesis** of compounds
- Determines characteristics

Structure of the Skin

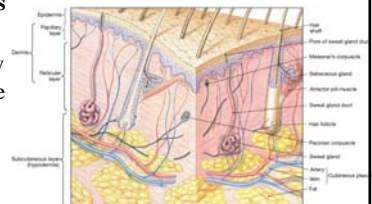
- 2 principal parts
 - **Epidermis**
 - **Dermis**
- Beneath the dermis
 - **Hypodermis**



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Epidermis

- **Stratified squamous epithelium**
- Approximately every month we shed entire skin surface
- Consists of **keratinocytes**



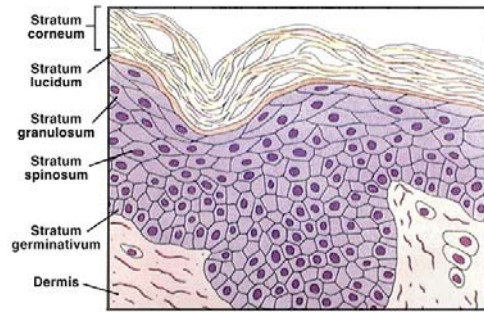
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Layers of the Epidermis (bottom to top)

- **Stratum Germinativum**
 - Cuboidal cells
 - Mitosis occurs
- **Stratum Spinosum**
 - Germinal cells shrink
 - Cells look spiny
- **Stratum Granulosum**
 - Produces **keratohyaline & keratin**
 - Cells die
- **Stratum Lucidum**
 - Found only in thick skin
 - “Clear layer”
 - Filled with keratin
- **Stratum Corneum**
 - Multiple layers
 - “**Cornified**”

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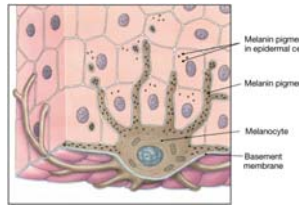
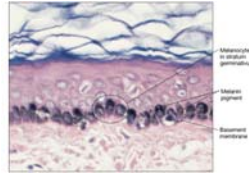
Layers of the Epidermis (bottom to top)



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Variations in Skin Color

- **Pigments**
 - **Melanin**
 - Produced by **melanocytes**
 - Protects skin from UV rays
 - **Carotene**
- **Lack of pigment**
 - **Albino**
- **Dermal blood supply**

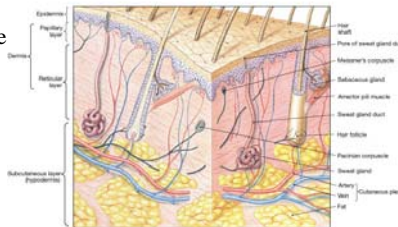


Epidermis and Dermis

- Epidermis is **avascular**
- Dermis is highly **vascular**
- Epidermis receives nourishment from dermis
- Cells far away from nourishment die

Dermis

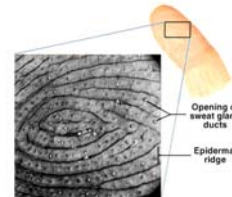
- Largest part of the skin
- **Connective tissue**
- **Contains**
 - Blood vessels
 - Nerves
 - Glands
 - **Hair follicles**
- **2 layers**
 - **Papillary layer**
 - **Reticular layer**



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Papillary Layer

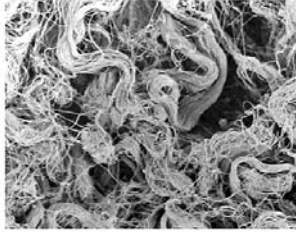
- Most superficial layer
- Loose connective tissue
- Surface area increased by **papillae**
 - Form fingerprints



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Reticular Layer

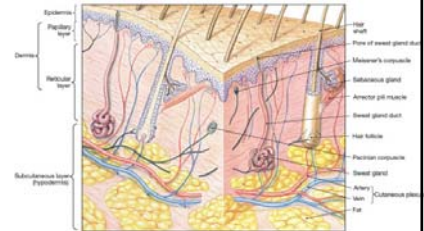
- Deeper layer
- Dense, irregular connective tissue
- Contains
 - Blood vessels
 - Glands
 - **Deep pressure receptors**



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Subcutaneous Layer

- Loose connective tissue
 - Packed with adipocytes
- Stabilizes position of skin



Epidermal Derivatives

- **Hair**
- **Glands**
- **Nails**

Hair (Pili)

- Came with **mammals**
- Embryological development & distribution
- Life span of hair
- What does hair do for mammals?

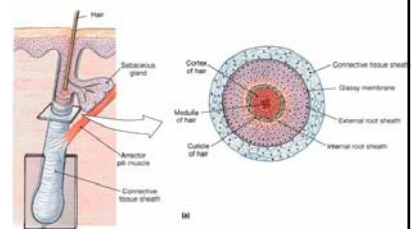
Functions of Hair

- Protection
- **Thermoregulation**
- Sensory
- Minor role in humans



Hair Structure

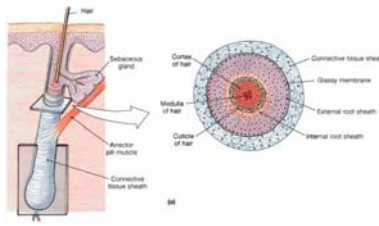
- **Shaft**
 - Superficial
- **Root**
 - Below surface



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Hair Structure

- **Medulla**
 - Soft core
- **Cortex**
 - Hard core
 - Gives hair stiffness
- **Cuticle**
 - Outermost layer



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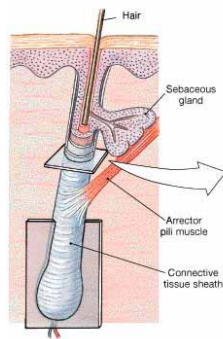
Hair Develops in Follicles

- Location
 - Deep in dermis
- Structure
 - **External root sheath**
 - **Internal root sheath**
 - **Bulb**
 - Contains **matrix**
 - **Hair papilla**
 - Contains blood vessels and nerves

<http://www.tgfolk.net/sites/gtg/tfb-elect.html>

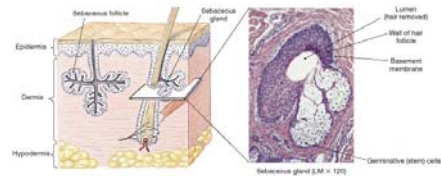
Arrector Pili

- Smooth muscle attaches to follicle
- Raises hairs
- Emotional response, cold
- Function?



Glands

- **Sebaceous glands**
 - Connected to hair follicles
 - Secrete a waxy, oily substance (**sebum**)
 - Develop in utero at about 5 months
 - Secretion increases at **puberty**



Glands

- **Sweat glands**
 - **Eccrine glands**
 - Found just about everywhere (esp. palms & soles)
 - Produce “**perspiration**”
 - Water, salt, met. wastes
 - **Merocrine secretion**

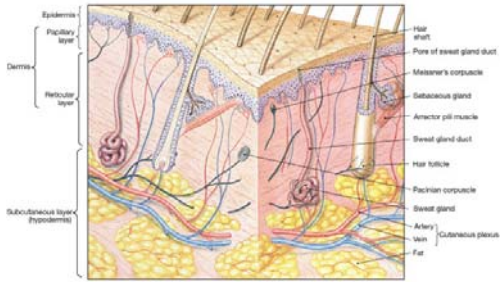
http://www.pg.com/science/skincare/Skin_tws_35.htm

Glands

- **Sweat glands (scent glands)**
 - Specific type of sweat gland
 - Found near hair follicles
 - **Axillary & genital regions**
 - Develop at puberty
 - Called “**apocrine**” sweat glands
 - Really merocrine secretion

http://www.pg.com/science/skincare/Skin_tws_35.htm

The Skin with Sweat Glands



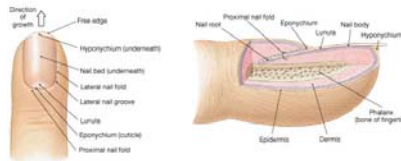
Nails

- Dorsal surfaces of ends of fingers & toes
- Primate feature
- Grasping



Nail Structure

- Nail body
- Free edge
- Nail root
 - Matrix
- Lunula (moon)



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Skin Cancer

Basal Cell Carcinoma



Squamous Cell Carcinoma



Melanoma

