Integumentary System

Skin (Integument, Cutaneous Membrane)

Skin Derivatives

Sweat glands
Sebaceous glands
Hair
Nails
Integumentary System

Functions

- Protection
- Production of vitamin D
- Sensation of $T^\circ$ and touch
- Regulation of body $T^\circ$

Pathogens
- UV radiation
- Dehydration
- Injury
Skin

Epidermis

Stratified squamous epithelium

Dermis

Areolar CT +

Dense Irregular CT
Hypodermis

Deep to the dermis

a.k.a. Superficial fascia

Anchoring

Insulation

Energy storage
Epidermis

Stratified squamous epithelium

Protection!

Most of the cells = keratinocytes

Cells that contain keratin

Fibrous, waterproof protein
Other epidermal cells

Epidermal dendritic cells

Tactile cells

Melanocytes
Melanocytes

Produce the pigment **melanin**

Transferred to the keratinocytes and protects their DNA from UV radiation
Epidermal dendritic cells (Langerhans cells)

Engulf and destroy pathogens

Travel to lymph nodes to present pathogen fragments to WBCs

Mount an immune response
Tactile cells (Merkel cells) → Light touch

Associated with a nerve ending
2 Basic Types of Skin

- **Thin skin** everywhere else
  - 4 thin layers

- **Thick skin** soles/palms
  - 5 thick layers
5 Layers of Thick Skin

Stratum corneum
Stratum lucidum
Stratum granulosum
Stratum spinosum
Stratum basale

Dermis

Thin skin lacks the stratum lucidum
Stratum Basale

- Basal most
- Superficial to dermis
- Single layer
- Mitotic cells
- Epidermal dendritic cells
- Tactile cells
Stratum Spinosum

Several layers

Cells linked by desmosomes

Mitotic cells

Epidermal dendritic cells

Melanocytes
Stratum Granulosum

Several layers

Cells becoming keratinized

Cells have visible granules
Stratum Lucidum

Several layers

Thick skin only
Stratum Corneum

Several layers

Cells are dead bags of keratin

Constantly shedding

Strong
Dermis

2 Major Layers:

1. Papillary dermis
2. Reticular dermis
Papillary Dermis

Upper ⅕

Areolar CT

Vascular

Upward projections called dermal papillae

Anchored to epidermal ridges
Abundant blood vessels

Allows heat to be delivered to skin surface

Body T° Regulation

Blood vessel dilates (vasodilation)

Blood vessel constricts (vasoconstriction)

Heat loss across epidermis
Sunlight
Skin
7-Dehydrocholesterol
Cholecalciferol (vitamin D₃)
Liver
25-hydroxyvitamin D₃
Kidney
1,25-dihydroxyvitamin D₃
Maintains calcium balance in the body

dietary intake
Vitamin D₃ (fish, meat)
Vitamin D₂ (supplements)
Reticular Dermis

Lower ⅛

Dense Irregular CT

Structural integrity
Types of Sweat Glands

- Merocrine sweat glands
- Apocrine sweat glands
Merocrine Sweat Glands

3,000,000

Exocrine

Coiled tube + duct

Water + ions, wastes, antibodies

Evaporative cooling
Apocrine Sweat Glands

Found in the axillae, pubic region, anal region.

Exocrine

Coiled tube + duct that empties into a hair follicle

Sweat contains lipids and proteins
Ceruminous Glands

Modified sweat glands

External ear canal

Cerumen

Bactericide

Fungicide

Insect repellant
Sebaceous Glands

Exocrine

Branch from hair follicles

Sebum

Moisturizing

Absences

Bactericide
Hair

Head (We’re bipeds!)
Axillae & Pubic region

Hair bulb
Hair papilla
Shaft + root
Follicle

Sensation
Arrector Pili Muscle

Vestigial

Piloerection