

The Integumentary system

by Maryam

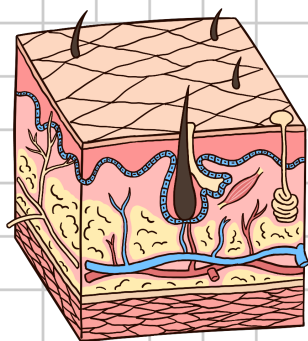
- skin
- accessory structures
 - Hair
 - Arrector pili muscle
 - Sebaceous and sweat glands
 - Nails

Structure of skin



Functions:

- 1 Regulation of body temperature
- 2 Blood reservoir
- 3 protection
- 4 Cutaneous sensations
- 5 Excretion and absorption
- 6 Synthesis of Vitamine D



Skin (Cutaneous membrane) → is the largest organ (surface area weight (16%))

thinnest → eyelids
thickest → heels

Epidermis

● Composed of stratified squamous Keratinized epithelium

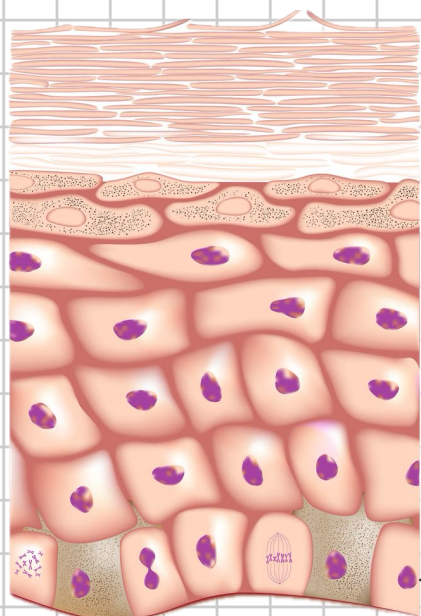
● Major cells:

- Keratinocytes
 - 90% of cells
 - form layers of epidermis
 - Produce Keratin
 - tough fibrous protein that provides protection
- Melanocytes
 - Produce pigment melanin
 - protects from damage by ultraviolet radiation
- Langerhans cells
 - Involved in immune responses
- Merkel cells
 - Function in sensation of touch along with the adjacent tactile discs
 - (derived from a neuron)

● Layers of

Epidermis

thin 4 layers
thick 5 layers



stratum corneum (The keratin layer)

- Composed of flat dead keratinocytes
 - called corneocytes
 - these are cell membrane filled with Keratin
- They are continuously shed and replaced by cells from deeper strata

→ stratum lucidum

- only in thick skin → fingertips, palms and soles

→ stratum granulosum

- Contains granules
 - could be
 - Keratohyalin
 - Lamellar granules

→ stratum spinosum

- 8-10 layers of keratinocytes

→ stratum basale

- deepest layer
- Continuous cell division occurs to produce all other layers

notes about the layers

- Merkel cells and cell bodies of melanocytes are found within the stratum basale
- The branches of melanocytes extend between adjacent keratinocytes to provide them with melanin pigment

- The lamellar granules of stratum granulosum bind with cell membrane and release lipid-rich secretion that fills spaces between cells to prevent water loss

- Keratin bind to desmosomes to help in adhesion of the cells to each other

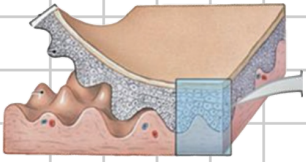
Dermis

- is a layer of connective tissue
- Provides structural and nutritional support for the epidermis
- Formed of two regions :

The overlap between dermis and epidermis is reflected on the surface of the skin by a pattern of elevations and depressions that form fingerprints and footprints
functions increase firmness of grip by increasing friction

1 outer papillary region (consists loose areolar connective tissue)

- Dermal papillae
(tissue of the dermis that projects between the epidermal ridges which are epidermal tissue passing down into the dermis)
This increase the area of contact between epidermis and dermis
- Capillary loops
- corpuscles of touch and free nerve endings



2 deeper reticular region (consists of dense collagenous irregular connective tissue)

- Adipose cells
- Hair follicles
- Nerves
- subcutaneous (oil) glands and sweat glands

Subcutaneous Tissue

- This layer and sometimes the dermis contains
 - lamellated (Pacini) corpuscles which detect external pressure applied to the skin
 - fatty tissue
- Functions:
 - Attaches the skin to the underlying tissue and organs
 - Acts as insulator
 - Serves as an energy storage site
 - Absorbs shocks (as in palms and soles)

Accessory structures of the skin

Hair (Pili)

- Composed of columns of keratinized cells bonded together by extracellular proteins
- It's present throughout the body except → Palms soles
- Function:
 - protection → on head protects scalp on eyebrows and eyelashes protect eye
 - Reduction of heat loss
 - Sensation of light touch

Sebaceous gland

- Located between the arrector pili muscle and hair
- opens into the hair follicle
- Secretion of this gland (sebum) prevents
 - ↳ dehydration
 - ↳ inhibits growth of certain bacteria

arrector pili muscle

- bundle of smooth muscle cells
- extends from superficial part of the dermis to dermal sheath of hair follicle
- under stressful conditions the muscle contracts pulling the hair making the shaft perpendicular to the surface and bulging the skin around the hair producing (goosebumps)

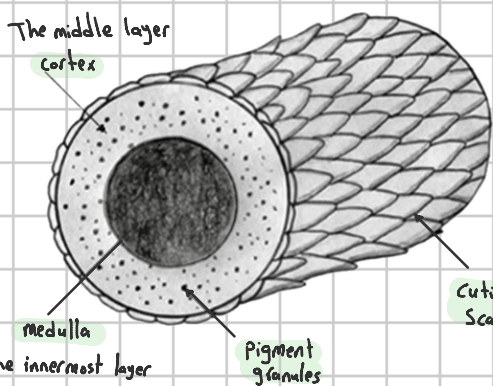
Sweat gland

Feature	Eccrine	Apocrine
Location	All over the body, specially palms and soles	Axilla, groin, and bearded facial regions of adult males
Shape	Coiled	Coiled
Secretion	Watery	More viscous (bacteria acts on this secretion to produce body odor)
Method of secretion	Merocrine	Merocrine
Opens	On the surface of the skin	Mostly into the hair follicle
Control	Nervous	Hormonal
Onset of action	From birth	At puberty
Functions	Helps cool the body. Elimination of waste products	Stimulated during emotional stress

Parts of hair

shaft
Root

formed of
1 - The medulla
2 - The cortex
3 - The cuticle



The shaft & superficial part of hair extends beyond surface of the skin

The Root & surrounded by hair follicle which is a downward extension of the epidermis

The outermost layer Formed of highly keratinized dead cells arranged like shingles on house roofs