

MIND MAP: THE HUMAN SKIN (The Jack of All Trades)







1. GENERAL FACTS & FUNCTIONS *

Stats:

Largest organ (15% of body weight).



Primary Nature: Impermeable barrier, tough & flexible.

- **Functions (The "Jack"):**

-  **Protection:**
 1. **Mechanical:** Shock absorption.
 2. **Fluids:** Prevents water loss (evaporation).
 3. **Germes:** Barrier against disease.
 4. **UV Rays:** Protection against sunlight.
-  **Temp Regulation:** Maintains constant body temp (Homeothermal).
-  **Sensation:** Touch, pain, pressure, heat.
-  **Synthesis:** Vitamin D (with sunshine).
-  **Excretion:** Salts, water, traces of urea (minor function).
-  **Grip:** Puckered skin on fingertips (friction).

2. STRUCTURE: THE LAYERS

A. EPIDERMIS (Outer Layer)

- *Note: No blood vessels here.*
- **1. Stratum Corneum (Cornified Layer):**
 -  **Structure:** Dead, flattened cells.
 -  **Protein: Keratin** (hard/tough).

- **Role:** Sheds continuously, barrier to water/bacteria.
- **2. Granular Layer:**
 - Thin middle layer, cells flattening.
- **3. Stratum Malpighi (Germinative Layer):**
 - 🌱 **Action:** Living cells, actively dividing to replace top layers.
 - 🎨 **Pigment: Melanin** (gives color/complexion).
 - **Abnormalities:**
 - *Leukoderma (Vitiligo):* Loss of melanin in patches.
 - *Albinism:* Complete genetic loss of pigment (pinkish skin/white hair).

B. DERMIS (Inner Layer)

- **Composition:** Elastic fibers, connective tissue (tough & flexible).
- **Contents:** Blood vessels, nerve fibers, sensory organs, hair follicles, glands.
- **Papillae:** Small projections containing capillaries/nerves; provide touch sense (fingerprints).

C. SUBCUTANEOUS FAT (Beneath Dermis)

- **Tissue:** Adipose tissue.
- **Function:** Food reserve, heat insulator, shock absorber.

3. DERIVATIVES OF SKIN

👤 HAIR

- **Parts:**
 - *Shaft:* Visible part.
 - *Root:* Embedded in dermis.
 - *Bulb & Papilla:* Growth & blood supply.
- **Color:** Due to melanin; turns grey/white with air spaces.
- **Goose Flesh (Piloerection):** caused by **Erector Muscle** contraction (keeps warm/emotional response).

- **Functions:** Nasal/Eyelash protection, sensation, forensic evidence.

NAILS

- Hardened keratinous plates.
- **Parts:** Plate (dead), Bed, Matrix (white half-moon, produces new cells).

GLANDS

- **Sebaceous (Oil) Glands:**
 - Secrete: **Sebum**.
 - Role: Waterproofing, suppleness.
 - *Problems:* Acne, Pimples, Blackheads (oxidation).
- **Sweat Glands:**
 - Secrete: Sweat (99% water, salt, 0.08% urea).
 - Role: Cooling (Evaporation).
 - *Note:* More pores on palms (grip).
- **Mammary Glands:**
 - Modified sweat glands.
 - Role: Milk production (Prolactin hormone).
- **Others:**
 - *Meibomian:* Eyelids (lubrication).
 - *Ceruminous:* Ear canal (Earwax/Cerumen).

4. THERMOREGULATION (Heat Control)

- **Controller: Hypothalamus** (Thermostat of the brain).
- **Normal Temp:** ~37°C (98.6°F).

IN COLD WEATHER (Conservation)

1. **Vasoconstriction:** Blood vessels *narrow*.
2. **Result:** Less blood to skin → Less heat lost by radiation/convection.

3. **Sweat:** Reduced secretion.

☀️ IN HOT WEATHER (Loss)

1. **Vasodilation:** Blood vessels *dilate/widen*.
2. **Result:** More blood to skin ➡ Heat lost by radiation.
3. **Sweat:** Evaporation causes cooling (Latent heat).
4. **Heatstroke:** When sweat cannot evaporate fast enough.

Quick Summary of Key Terms

- **Keratin:** Protein for toughness (Nails, Cornified layer).
- **Melanin:** Pigment for color/UV protection (Malpighian layer).
- **Sebum:** Oil for suppleness (Sebaceous gland).
- **Homeothermal:** Warm-blooded (maintaining constant temp).
- **Vasoconstriction:** Narrowing vessels (Save heat).
- **Vasodilation:** Widening vessels (Release heat).

