THE INTEGUMENTARY SYSTEM

The integumentary system consists of the **cutaneous membrane (skin)** and its **accessory structures**, including the hair, nails, sebaceous glands, and sweat glands.

The cutaneous membrane or skin , is the largest system of the body, accounting for about 15% of total body weight and covers more than 3,000 square inches. It is supplied with blood vessels and nerves and performs many vital functions, including

- Protection of underlying tissues and organs
- Excretes salts, water, and organic wastes (glands)
- Maintains body temperature (insulation and evaporation)
- Synthesizes vitamin D_3
- Stores lipids
- Detects touch, pressure, pain, and temperature

1- Epidermis

Stratified squamous epithelium covering the body it is thickness varies from 30mm to 4mm or more. Subdivided into 5 identifiable layers:

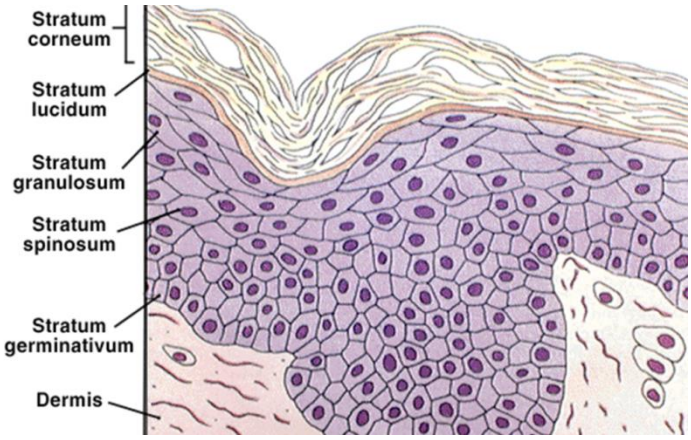
a- **The stratum corneum:** most superficial, thickest of all layers; 3/4th 's the thickness of epidermis, 20-30 cell layers thick dead cells completely filled with keratin

b- **The stratum lucidum:** thin translucent band only found in thick areas of epidermis: soles of feet palms of hand.

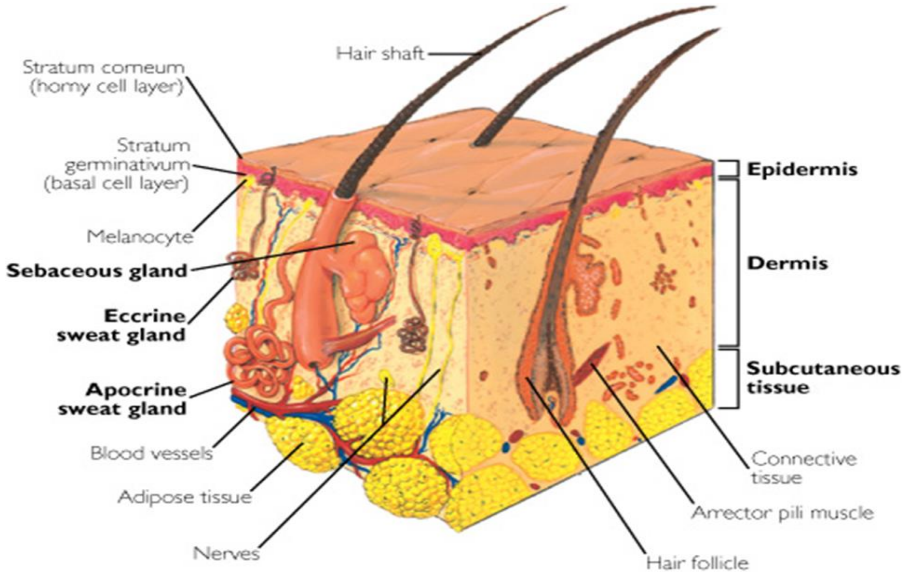
c- **The stratum granulosum:** very thin; 2-3 cell layers thick as cells move up from s. basale they die & get flatter and thinner keratinization begins here.

d- **Stratum spinosum:** increasing thickness of epithelium, contains Langerhans cells and active in immune response.

e- **The stratum germinativum** : is composed of several layers of living cells capable of cell division. It is the innermost layer of the epidermis, and contains melanin… the pigment that gives color to the skin.



2-The dermis: is beneath the epidermis and is composed of connective tissue. It contains the lymphatics, nerves, nerve endings, blood vessels, sebaceous and sweat glands, elastic fibers, and hair follicles.



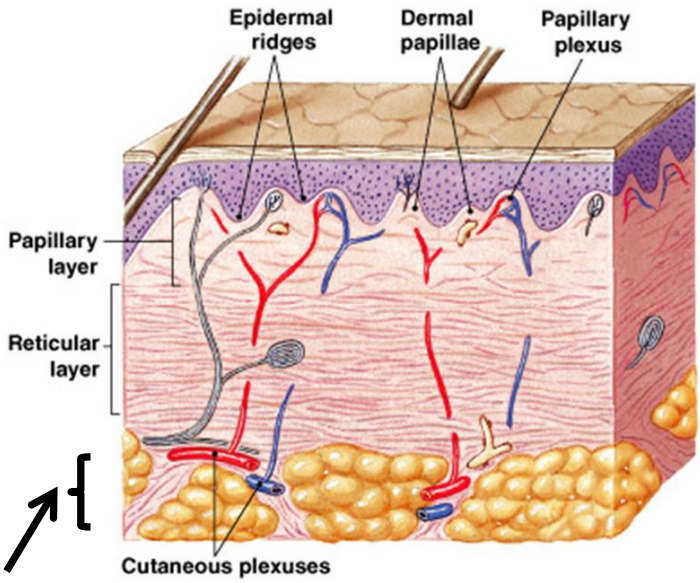
The dermis is divided into two layers…

1. **The papillary layer** is arranged into microscopic structures that form ridges. These are the finger- and footprints. Consists of areolar connective tissue with lots of blood vessels and sensory cells.

2-The reticular layer Consists of dense irregular connective tissue. Contains larger blood vessels, lymph vessels, and nerve fibers, collagen and elastic fibers.

Artries

Cutaneous plexus: a network of arteries along the reticular layer
Papillary plexus: capillary network from small arteries in papillary layer



HYPODERMIS

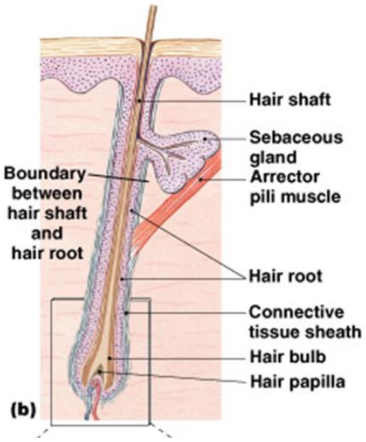
3-Hypoderm: The dermis is connected to underlying tissue by the subcutaneous tissue. The subcutaneous tissue or hypodermis is composed of adipose and connective tissue. It supports, nourishes, insulates, and cushions the skin**.**

Skin color: due to combination of three different pigments: **melanin:** yellow, orange, brown or black pigments racial shades due mainly to kinds and amount of melanin pigments mainly in stratum basale also, amount varies with exposure to sun. **carotene** esp in stratum corneum and subcutaneous layers **hemoglobin** in blood of skin capillaries

Derivitives of skin

1-The hair is a threadlike structure formed by a group of cells that develop within a hair follicle or socket. Each hair has a shaft that is visible and a root that is embedded in the follicle.

A pilomotor muscle is attached to the side of each follicle. It is stimulated by skin irritants, emotional arousal, or cold temperatures, and reacts by contracting. At the base of each hair follicle is a bulb enclosing a loop of capillaries. It is called the **hair papilla** and provides nourishment to the hair. It is one of the few living parts of the hair, and is responsible for hair growth.

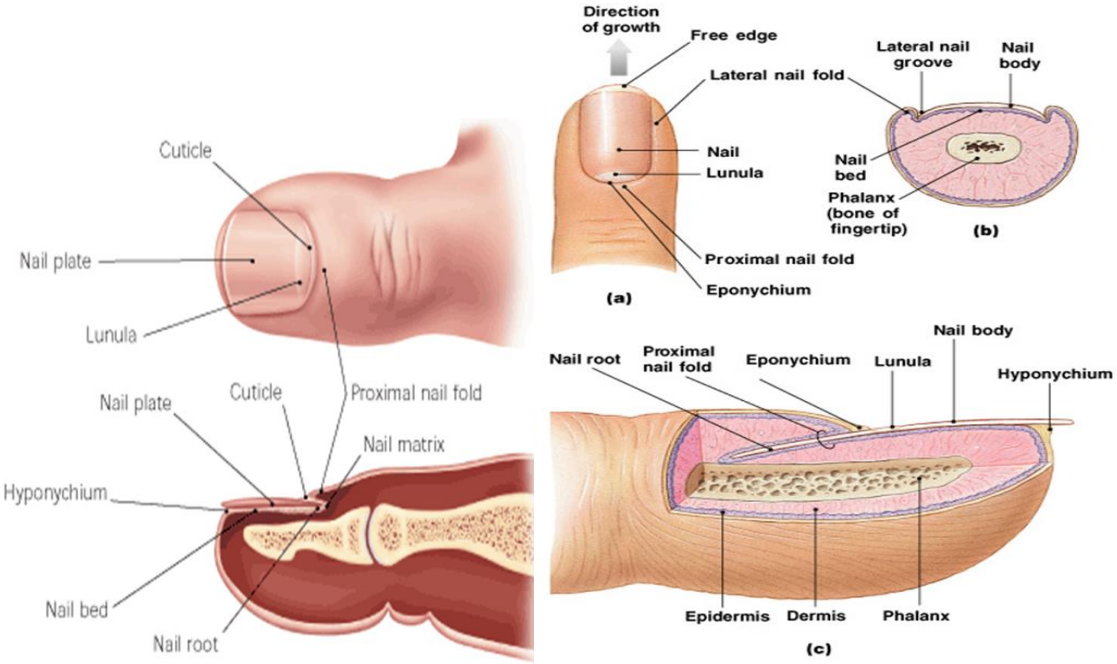


The transparent **cuticle** covers the hair shaft like shingles on a roof, protecting it from the elements and chemicals, and from losing moisture. The **cortex** provides most of the hair's weight. It contains melanin which provides color to the hair, stores oils, provides flexibility and elasticity, and adds shape to the hair.. The **medulla** is a inner hollow core that runs the length of the shaft.

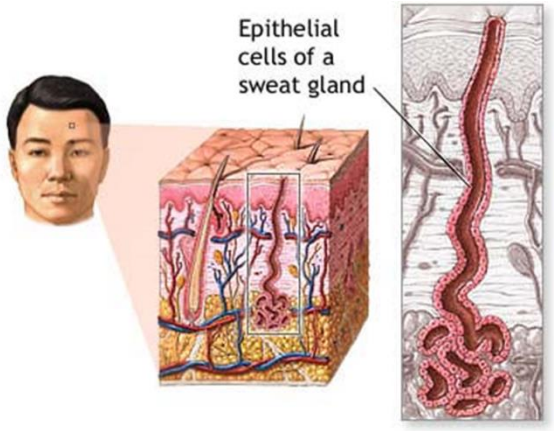
Sebaceous glands are oil glands. They have tiny ducts that open into each hair follicle. Each sebaceous gland secretes sebum, which lubricates the hair and skin.

2-**Nail** : fingernails and toenails are hard keratin structures that protect the ends of the fingers and toes. The nail root, also called the germinal matrix or nailbed, begins several millimeters into the finger and extends to the edge of the white, crescent-shaped lunula. This is where the growth occur. The under-surface of the nail plate or body of the nail has grooves that help anchor it.
The **cuticle** is also called the eponychium. It fuses the nail plate and the skin of the finger together to form a waterproof barrier.

The **hyponychium** is under the free edge of the nail. It also creates a waterproof barrier, fusing the skin of the finger to the underside of the nail plate.



3-Sudoriferous glands are sweat glands. About 2 million are distributed over the surface of the body, more numerous on the palms of the hands, soles of the feet, forehead, and axillae or underarms.



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Sweat glands produce sweat or perspiration. As sweat collects on the skin surface, it evaporates and creates a cooling effect. Sweat also rids the body of waste through the pores of the skin.