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common integument

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- The common integument comprehends ordinary skin with its covering of hair and variety of skin glands as well as more specialized parts such as claws ,hoofs ,and horn.

The skin completely encloses the body and blends with the mucous membranes at the various natural openings.



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- **Functions of the skin**
- **protection**
- **Excretion**
- **Body temperature regulation**
- **Cutaneous sensation**
- **Vitamin D synthesis**



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- **protection**

chemical factors in the skin:

Sebum (or oil) from the sebaceous glands is slightly acidic, retarding bacterial growth on the skin surface.

Sweat from the sweat gland (sudoriferous glands) is slightly hypertonic and can flush off most bacteria on the skin surface.

Melanin (skin pigment) from melanocytes avoids excessive ultraviolet radiation from penetrating the skin layers .



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- physical factors in the skin:
Stratified squamous epithelium in the epidermis layer provides a large number of layers of cells, preventing most bacteria invasion.
Keratinized cells in the stratum corneum layer of the epidermis provides a physical barrier against most invasion.



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- biological factor in the skin:

White blood cells such as **macrophages** destroy most invaded bacteria and other foreign substances.



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- **Excretion**

waste materials such as ammonia , urea , and excessive salt are eliminated from sweating .

Body temperature regulation

- **Sweating** by the sweat glands promotes evaporation, resulting in a loss of excessive body heat.



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- ● **Vasoconstriction** by arterioles (small arteries) in the dermis layer provides a smaller surface area in the blood vessels, resulting in less heat loss.
- ● **Vasodilatation** by arterioles in the dermis layer provides a larger surface area in the blood vessels , resulting in greater heat loss .



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- **Cutaneous sensation**

Nerve receptors in the dermis layers detect sensations such as heat, cold, pain, pressure, and touch, allowing the body to be aware of these stimuli.

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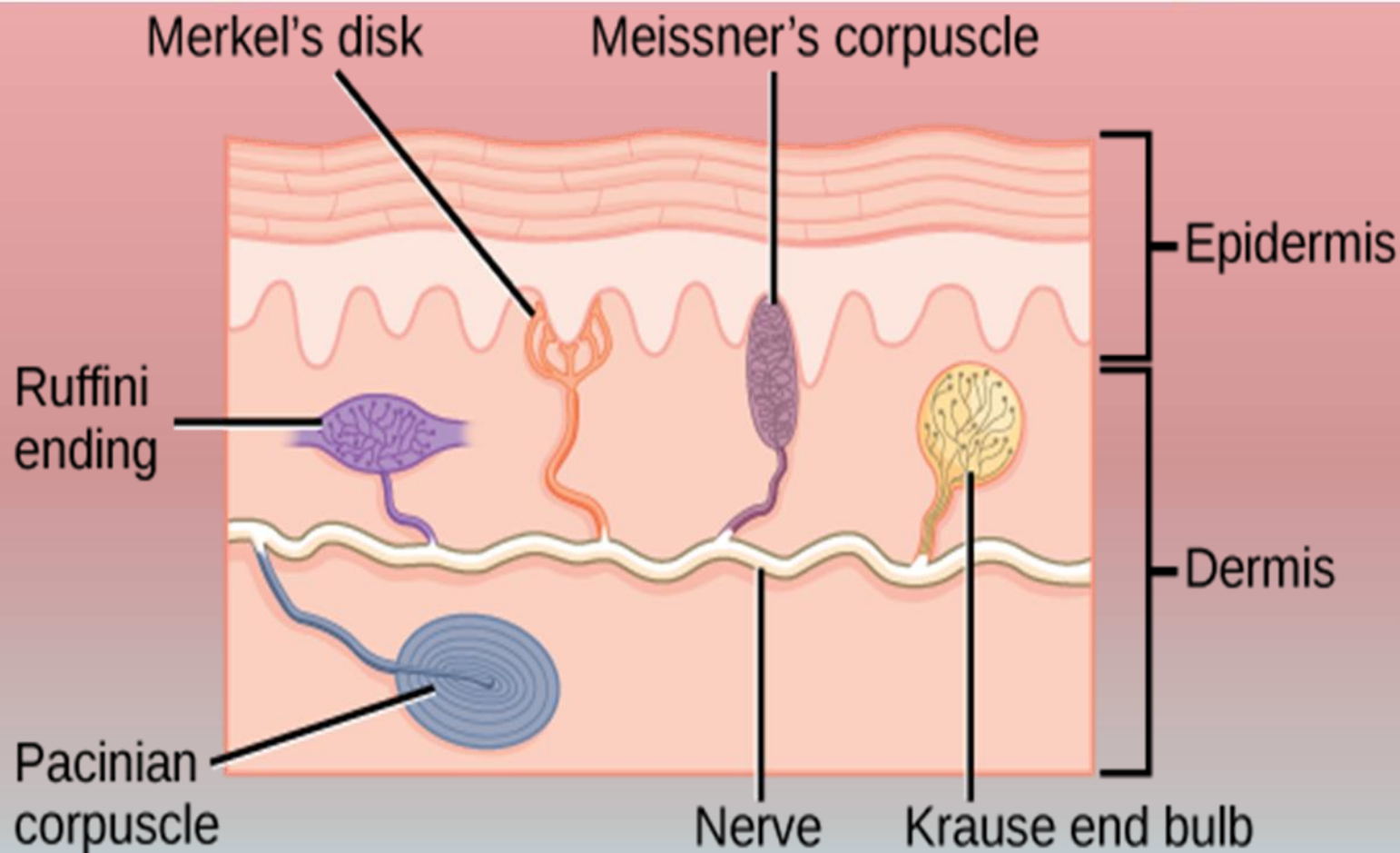
- **Vitamin D synthesis**

Ultraviolet radiation in the sunlight activates a series of chemical reactions in the epidermis layer, resulting in the synthesis of vitamin D from the modification of cholesterol for the absorption of calcium.



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- **The structure of the skin:**

1-Epidermis

• Being made of stratified squamous epithelium , there is no blood vessels to supply nutrients to its cells. Nutrients from the arterioles in the dermis layer diffuse upward into the epidermis layer, Cuboidal cells at the **stratum basale (stratum germinativum)** layer receive most of the nourishment . These cells reproduce rapidly using mitosis . New daughter cells will be pushed upward into higher layers , and they become flattened as they move upward .Squamous cells moving upward in the epidermis receive less and less nutrients as diffusion distance increases. By the time they form **stratum corneum**, the cells are dead and will be shed off from the skin.



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- 2-Dermis

•made of fibrous connective tissue that contains arterioles for supplying nutrients (i.e. oxygen , glucose , water , and ions) to its structures and to the epidermis . also contains pili arrector muscles (made of smooth muscle, under involuntary control) to wrinkle the skin and erect the hairs ,contains **nerves** and nerve receptors to detect the sensations of heat, cold, pressure, touch, and pain ,also contains hair follicles to develop the hair , and contains sebaceous gland to secrete sebum onto skin surface, and sudoriferous glands to secrete sweat.



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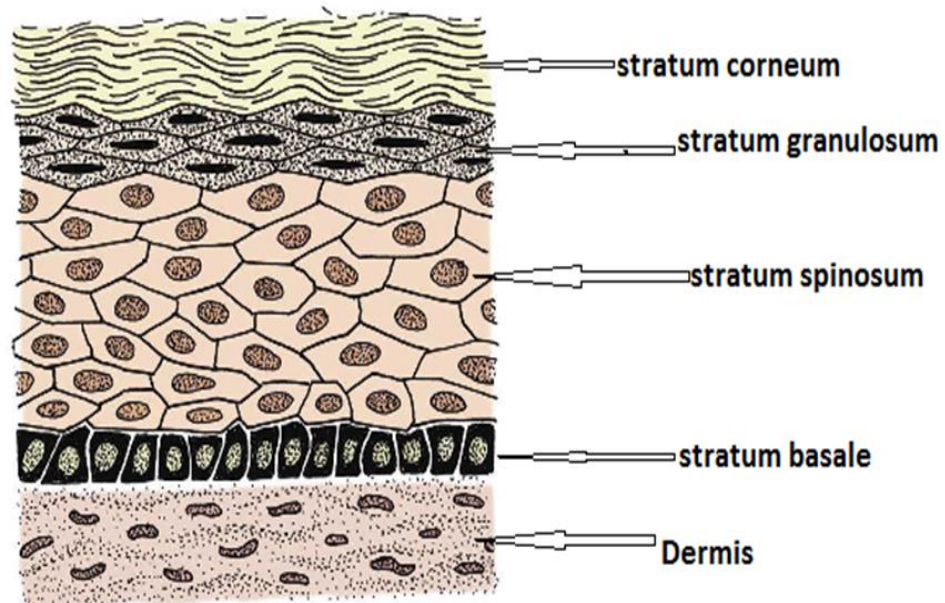
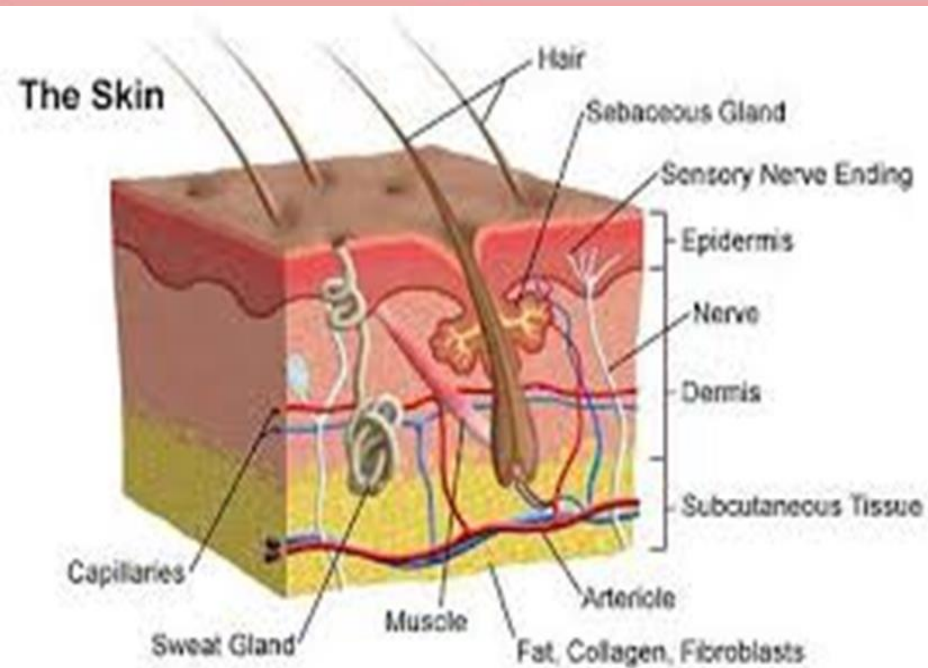
- **3-Hypodermis**

Made of adipose tissue and loose connective tissue, collagen and elastic fibers in the loose connective tissue are continuous with the fibers in the dermis layer. Adipose tissue serves as a heat insulator against cold climate and as a fat storage. Loose connective tissue allows the skin to be bound with underlying muscles. Also contains large blood vessels (arteries and veins).



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The skin



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- Accessory structures of the skin

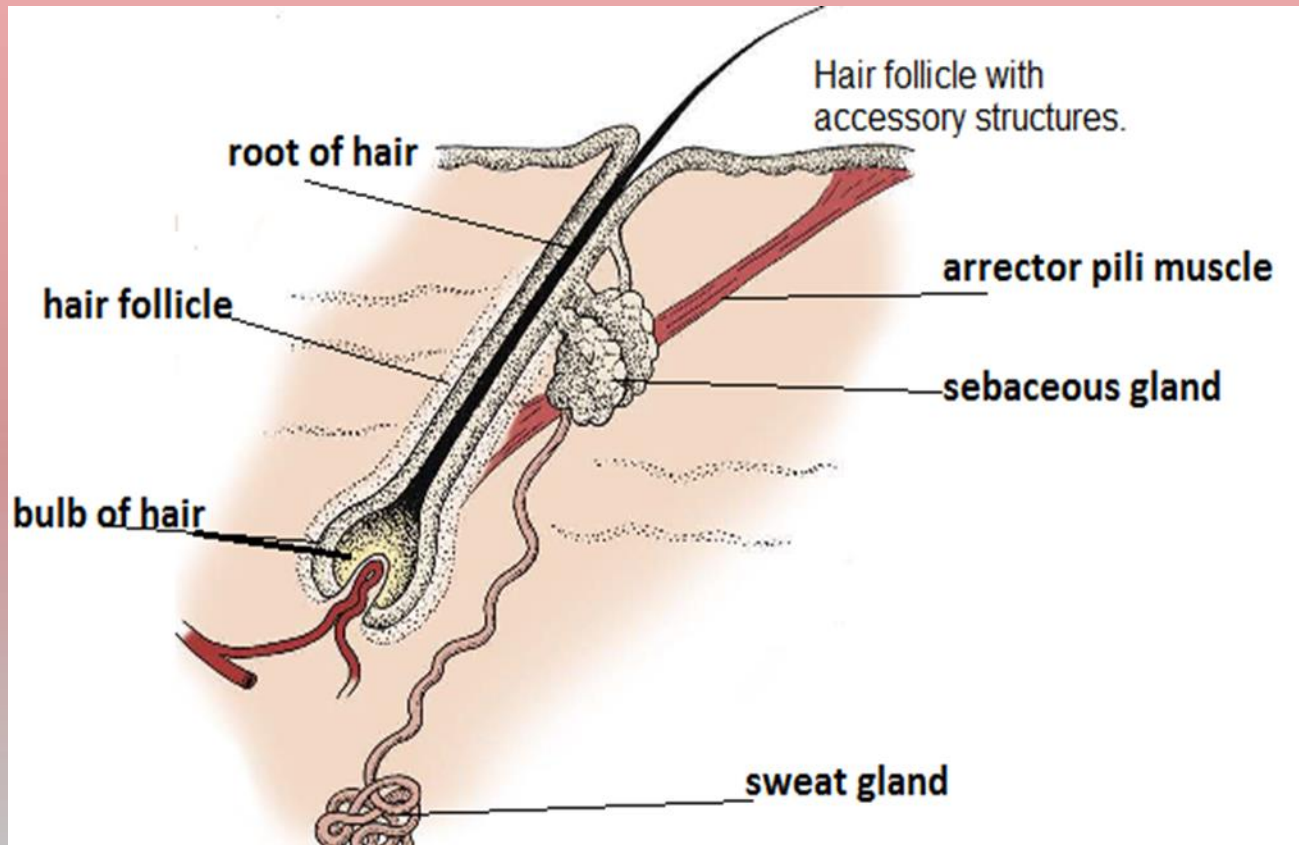
Hair

Hair is a mammalian feature, diagnostic of the class. In most species a thick hair coat is spread over the body, produced by epithelial cells at the **hair papilla**, made of keratinized cells, consists two regions: **hair root** (in the hair follicle, embedded in the dermis layer), and **hair shaft** (protruded through the epidermis to the outside). Hair pigment (melanin) is produced by melanocytes in hair papilla. Hair growth is affected by nutrition and hormones (i.e. testosterone).



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- **2-Tactile hairs:**

Are thicker and generally protrude beyond the neighboring hairs. Most are found on the face, principally on the upper lip and about the eyes. Tactile hair follicles reach deeply into the subcutis or even the superficial muscles.

They are characterized by the presence of a venous sinus filled with blood and located between inner and outer layers of the dermal sheath.



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- THANK YOU FOR YOUR LISTENING