

the INTEGUMENT (SKIN) and DERIVATIVES

The integumentary system is composed of the integument (the skin) and its derivatives, including the hairs, sweat glands, and oil glands. As the largest body organ, the skin provides protection to the body and performs other functions noted in this plate.

Begin your work by coloring the main title The Integument (Skin) and Derivatives. In looking over the plate, you will note a section of the skin, including the hairs, glands, and other structures within it. One portion of the skin has been shown in detail to explore its layers. As you begin your study of the integumentary system, prepare to use light and pale colors, because many tissues are detailed, and it is good to preserve their important points of interest. Color the titles as you read them below, then color the structures in the plate.

On a structural basis, the skin is composed of three parts. At its surface is the **epidermis (A)**, which is outlined by a bracket. The next deep layer contains connective tissue and is called the **dermis (B)**. Then comes a subcutaneous layer called the **hypodermis (C)**.

Returning to the epidermis, we note the detailed view and identify five layers of tissue. The most superficial layer is the **stratum corneum (A₁)**. This is a layer of flat, dead cells filled with the protein keratin. The layer protects against heat, pathogenic microorganisms, chemicals, and light. Then comes the **stratum lucidum (A₂)**. Clear, flat cells with a prekeratin substance called eleidin are found here. The layer is found primarily in the palms of the hands and soles of the feet.

The next lower layer of the epidermis is the **stratum granulosum (A₃)**, which contains flattened cells containing the substance keratohyalin. Later, this material will become keratin. The next deeper layer is a very large layer called the **stratum spinosum (A₄)**. Keratin is produced in many of these cells.

The deepest layer is the **stratum basale (A₅)**. It is a single layer of cuboidal and columnar cells that undergo mitosis and become the cells of the more superficial layers. The layer is also called the stratum germinativum.

We now focus on the dermis and note some of the important structures within this layer. Different tissues will be found within this layer, and their presence designates the skin as an organ. Among the functions performed by tissues in this layer are protection, excretion, sensation, and immunity to disease. Continue your coloring as you read below.

The dermis contains many fibers of collagen together with various kinds of cells. The most superficial region of dermis is the papillary region with fingerlike projections in the epidermis. The remainder of the dermis is the dermal layer.

Within the dermal layer are a number of **sebaceous glands (D)**. These oil glands are generally connected to hair follicles, as the plate indicates. Their secretion is an oily substance called sebum. Other glands in the dermis are the **sweat glands (E)**, also called sudoriferous glands. These glands deliver their watery secretions (sweat) to **sweat gland ducts (E₁)**, which lead to **sweat gland pores (E₂)**. A spot of color may be used for the pores. Sweat performs excretory functions by delivering metabolic waste products to the skin surface for removal. It also helps regulate body temperature.

We now focus on a tissue within the dermis, the hair. Hair provides protection and decreases heat loss. Its color is primarily due to the pigment melanin. As you read about the hair fibers below, locate and color their parts in the plate.

Hairs are epidermal growths distributed in varying amounts and textures throughout the body. The **hairs (F)** in the plate should be colored at the surface. The superficial part of the hair is the **shaft (F₁)**, projecting above the body surface. The portion penetrating into the dermis is the **root (F₂)**. The root of the hair is covered by the **root sheath (F₃)**, which is a continuation of the epidermis, as the plate indicates. At the base of the hair follicle is the enlarged **hair bulb (F₄)**. An indentation called the **papilla (F₅)** contains connective tissues and blood vessels to provide nourishment to the hair.

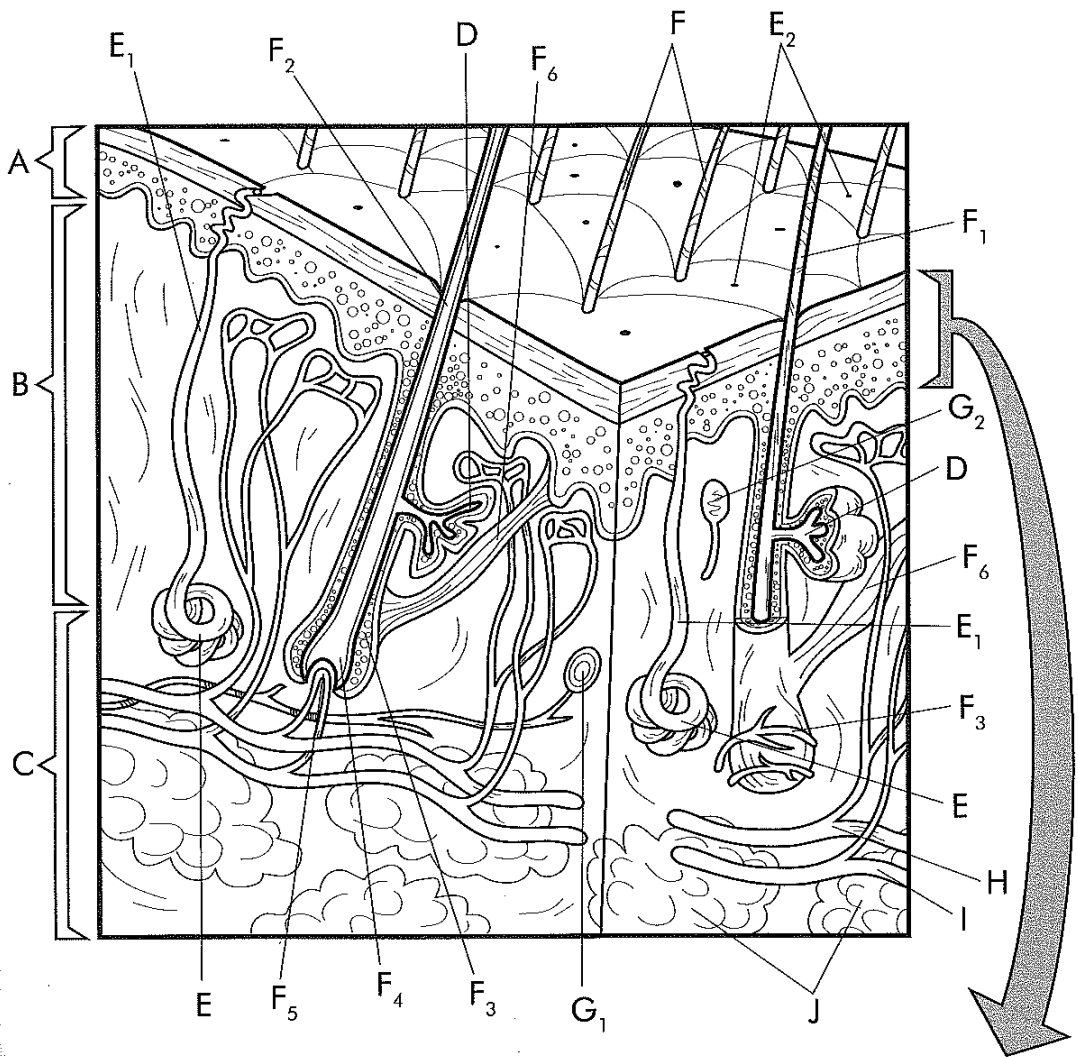
At the side of the hair follicle is a specialized smooth muscle called the **erector pilius (F₆)**. This muscle contracts during stress and pulls the hair to the upright position. It can be seen in both hair fibers in the plate.

The plate closes with a brief look at the nerve receptors in the dermis and structures within the hypodermis. Complete your coloring as you read the paragraph below.

Many types of nerve receptors are located within the dermis. The plate on touch receptors treats them in detail, but we mention two receptors here. The first is the **Pacinian corpuscle (G₁)**. This nerve receptor detects vibrations and heavy touch sensations and sends impulses off to the brain. **Meissner's corpuscles (G₂)** detect light touch sensations and dispatch impulses for interpretation.

In the hypodermis, the plate shows a number of nerves, as well as the blood supply of the integumentary system. An **artery (H)** carries blood to the skin, while a **vein (I)** carries blood away. Red and blue colors may be used, respectively. Much **fat tissue (J)** is found in the hypodermis to provide cushioning to the skin. The underlying muscles are below the hypodermis.

THE INTEGUMENT (SKIN) AND DERIVATIVES



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|--------------------|----------------|---|----------------------|----------------|---|
| Epidermis | A | ○ | | | |
| Stratum corneum | A ₁ | ○ | | | |
| Stratum lucidum | A ₂ | ○ | | | |
| Stratum granulosum | A ₃ | ○ | | | |
| Stratum spinosum | A ₄ | ○ | | | |
| Stratum basale | A ₅ | ○ | | | |
| Dermis | B | ○ | | | |
| Hypodermis | C | ○ | | | |
| Sebaceous glands | D | ○ | | | |
| Sweat glands | E | ○ | | | |
| Sweat gland ducts | E ₁ | ○ | | | |
| Sweat gland pores | E ₂ | ○ | | | |
| Hair | F | ○ | | | |
| Hair shaft | F ₁ | ○ | | | |
| Root | F ₂ | ○ | | | |
| | F ₃ | ○ | Root sheath | F ₃ | ○ |
| | F ₄ | ○ | Bulb | F ₄ | ○ |
| | F ₅ | ○ | Papilla | F ₅ | ○ |
| | F ₆ | ○ | Errector pilius | F ₆ | ○ |
| | G ₁ | ○ | Pacinian corpuscle | G ₁ | ○ |
| | G ₂ | ○ | Meissner's corpuscle | G ₂ | ○ |
| | H | ○ | Artery | H | ○ |
| | I | ○ | Vein | I | ○ |
| | J | ○ | Fat tissue | J | ○ |