



## Chapter 9-1: 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. The skin provides protection to the body and is the largest body organ.

In looking over the plate, you will notice that we present a section of skin that includes hairs, glands, and other structures. As you begin your study of the integumentary system, prepare to use light and pale colors, because many tissues are detailed.

Structurally, the skin is composed of three parts. At its surface is the **epidermis (A)**, which is outlined by a bracket. The next layer is made up of connective tissue and is called the **dermis (B)**, and there is an even deeper layer called the **hypodermis (C)**.

Now take a look at the detailed view of the epidermis, in the lower right hand corner. The most superficial layer of the skin is the **stratum corneum (A<sub>1</sub>)**. This is a layer of flat, dead cells that are filled with the protein keratin. This layer protects against heat, pathogenic microorganisms, chemicals, and light. The next layer down is the **stratum lucidum (A<sub>2</sub>)**. Clear, flat cells that contain a prekeratin substance called eleidin are found here. The layer exists primarily in the palms of the hands and soles of the feet.

The next layer of the epidermis is the **stratum granulosum (A<sub>3</sub>)**, which is made up of cells that contain the substance keratohyalin. Later, this material will become keratin. The next layer is very deep, and is called the **stratum spinosum (A<sub>4</sub>)**. Keratin is produced in many of the cells of the stratum spinosum.

The deepest layer is the **stratum basale (A<sub>5</sub>)**. It is a single mixed layer of cube-shaped and tall cells, which undergo mitosis to become the cells of the more superficial layers. The layer is also called the stratum germinativum.

We will now focus on the dermis and point out some of its important structures. The tissues in this layer provide protection, sensation, and immunity to disease. Continue your coloring as you read below.

The dermis contains collagen fibers as well as various types of cells. The most superficial region of dermis is the papillary region, and its shallow projections can be seen projecting into the epidermis. The remainder of the dermis is called the dermal layer.

Within the dermal layer are a number of **sebaceous glands (D)**. These glands secrete an oily substance called sebum and are generally connected to hair follicles, as the plate indicates. Other

glands in the dermis are the **sweat glands (E)**, which are also called the sudoriferous glands. These glands deliver watery secretions (sweat) to **sweat gland ducts (E<sub>1</sub>)**, which lead to **sweat gland pores (E<sub>2</sub>)**. A spot of color should be used to trace the pores. Sweat delivers metabolic waste products to the skin surface for removal, and also helps regulate body temperature.

We now focus on the hair. Hair provides the skin with protection and decreases loss of body heat. 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.

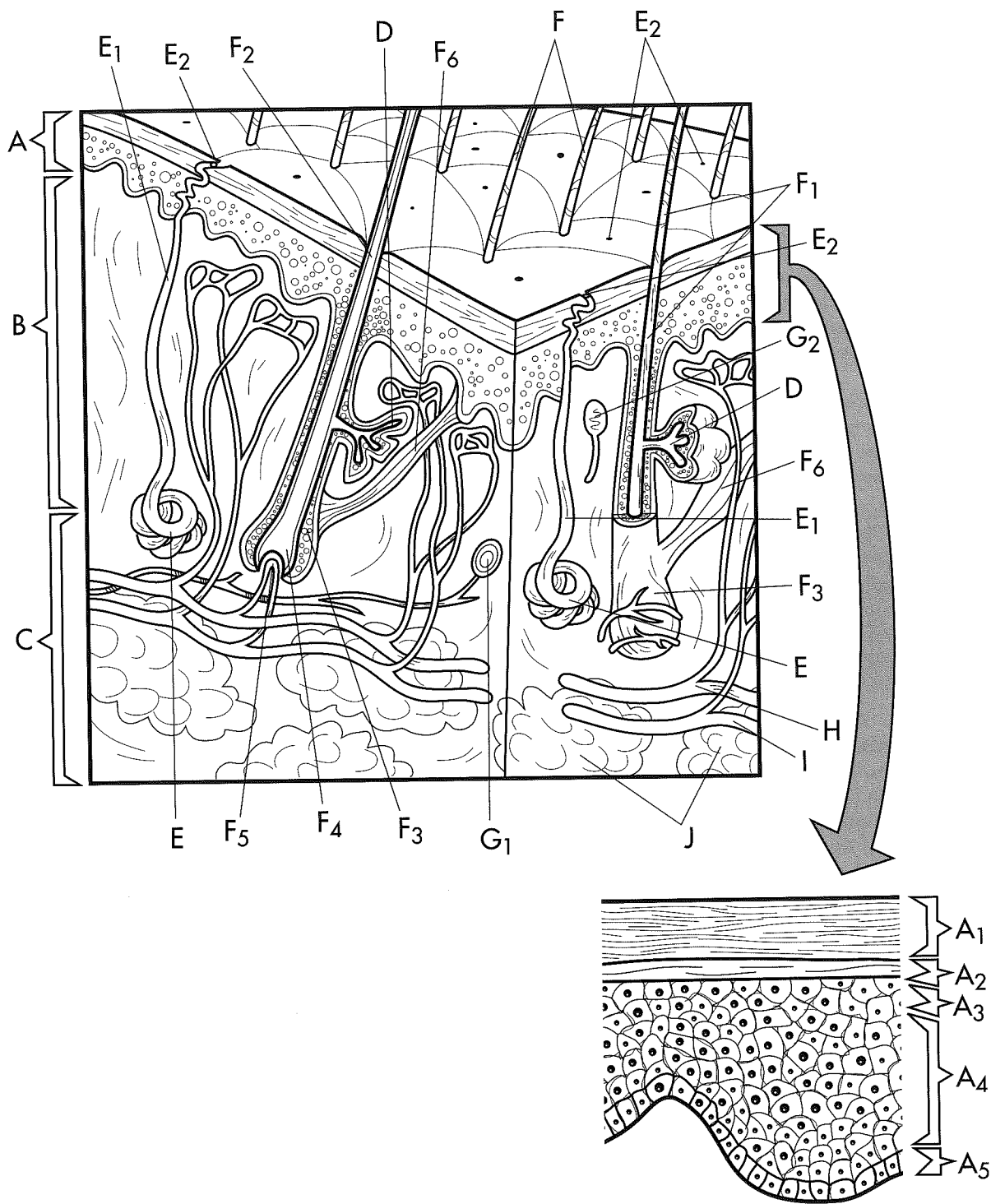
Hairs are epidermal growths that vary in amount and texture throughout the body surface. The **hairs (F)** in the plate should be colored at the skin's surface.

The part of the hair that projects above the body surface is called the **shaft (F<sub>1</sub>)**. The portion that penetrates into the dermis is the **root (F<sub>2</sub>)**. The root of the hair is covered by the **root sheath (F<sub>3</sub>)**, which is a continuation of the epidermis, as the plate indicates. At the base of the hair follicle is the enlarged hair **bulb (F<sub>4</sub>)**. An indentation called the **papilla (F<sub>5</sub>)** contains connective tissues and blood vessels that provide nourishment to the hair. At the side of the hair follicle is a section of specialized smooth muscle called the **arrector pili (F<sub>6</sub>)**. This muscle contracts during stress and pulls the hair into an upright position.

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

Many different types of nerve receptors are located within the dermis; one is the **Pacinian corpuscle (G<sub>1</sub>)**. This nerve receptor detects vibrations and heavy touch sensations and sends impulses to the brain, while another type of receptor, called **Meissner's corpuscle (G<sub>2</sub>)**, detects light touch sensations.

There are also a number of nerves in the hypodermis, which is the site of the blood supply of the integumentary system. An **artery (H)** carries blood to the skin, and a **vein (I)** carries blood away. Red and blue colors may be used for these structures, respectively. Finally, the **fat tissue (J)** in the hypodermis provides support and cushioning to the skin.



The Integument (Skin) and Derivatives

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|--|--|--|
| <input type="radio"/> Epidermis.....A                      | <input type="radio"/> Sebaceous Glands .....D              | <input type="radio"/> Bulb.....F <sub>4</sub>              |
| <input type="radio"/> Stratum Corneum .....A <sub>1</sub>  | <input type="radio"/> Sweat Glands .....E                  | <input type="radio"/> Papilla .....F <sub>5</sub>          |
| <input type="radio"/> Stratum Lucidum .....A <sub>2</sub>  | <input type="radio"/> Sweat Gland Ducts ....E <sub>1</sub> | <input type="radio"/> Arrector Pilius .....F <sub>6</sub>  |
| <input type="radio"/> Stratum Granulosum....A <sub>3</sub> | <input type="radio"/> Sweat Gland Pores ....E <sub>2</sub> | <input type="radio"/> Pacinian Corpuscle....G <sub>1</sub> |
| <input type="radio"/> Stratum Spinosum.....A <sub>4</sub>  | <input type="radio"/> Hair .....F                          | <input type="radio"/> Meissner's Corpuscle..G <sub>2</sub> |
| <input type="radio"/> Stratum Basale.....A <sub>5</sub>    | <input type="radio"/> Hair Shaft.....F <sub>1</sub>        | <input type="radio"/> Artery .....H                        |
| <input type="radio"/> Dermis .....B                        | <input type="radio"/> Root.....F <sub>2</sub>              | <input type="radio"/> Vein .....I                          |
| <input type="radio"/> Hypodermis .....C                    | <input type="radio"/> Root Sheath .....F <sub>3</sub>      | <input type="radio"/> Fat Tissue .....J                    |