

# Integument System Study Guide 1

## Chapter 6 Skin and Integumentary System

### Definition of Word Parts (p. 170)

- alb-, white
- cut-, skin
- derm-, skin
- epi-, upon, after, in addition
- follic-, small bag
- hol-, entire, whole
- kerat-, horn
- melan-, black
- por-, passage, channel
- seb-, grease

### 6.1 Introduction (p. 171)

- A. An organ has two or more kinds of tissues grouped together to perform specialized functions.
- B. The skin is the largest organ by weight in the human body.
- C. Skin is a strong, flexible covering of the human body. Together with its accessory structures, it makes up the integumentary system.

### 6.2 Skin and Its Tissues (p. 171)

- A. The functions of skin are: to assist in maintaining homeostasis; to act as a protective covering that prevents harmful substances and microorganisms from entering the body; to prevent water loss thus maintaining fluid balance and heat; to house sensory organs thus providing information about the external environment; to house immune cells; to synthesize chemicals including Vitamin D; and to excrete small quantities of waste.
- B. The epidermis contains stratified squamous epithelium; the dermis is composed of irregular dense connective tissue containing collagen and elastic fibers, epithelial tissues, muscle tissue, nervous tissue, and blood. The basement membrane is composed of non-living tissue and is anchored to the dermis by short fibrils.
- C. The layers of the skin are the **epidermis** and the **dermis**.
- D. The subcutaneous layer containing masses of connective and adipose tissue is not part of the skin but binds the skin to underlying organs.



E. Drugs can be injected into and under the skin the three ways: Between in layers of the skin (intradermally), beneath the skin (subcutaneously), and into muscles (intramuscularly). Drugs can also be delivered through the skin transdermally via an adhesive transdermal patch. The patch contains a small reservoir filled with a drug, which is delivered at a prescribed rate into the blood vessels of the dermis. A new type of patch that uses microneedles to pierce holes in the stratum corneum is not yet commercially available.

G. Water is not absorbed through the skin because strands of keratin, a waterproof protein, are synthesized and stored within skin cells.

H. The cells of the stratum basale are stimulated to make increased numbers of cells in areas like the soles of the feet and palms of the hands where there is increased friction and wear. As a result, many layers of tough, tightly packed cells accumulate and protect the underlying tissues of the skin.

N. Fingerprints are formed by ridges in the epidermis, which project downward. The dermis has conical papillae, which pass upward into the spaces between the epidermal ridges.

P. The dermis contains smooth muscle fibers that can wrinkle the skin when they contract. They also make the hairs on your skin stand up in response

to cold or fear. They also raise the testes in the scrotum. Skeletal muscles in the face are anchored to the dermis and produce facial expression.

Q. There are both motor and sensory nerves in the skin. The motor nerves innervate glands and muscles in the dermis. The sensory fibers carry impulses from specialized receptors in the skin to the brain for interpretation. They detect pressure, touch, temperature.

#### B. Hair Follicles

1. Hair is present on all skin surfaces except on the palms of the hands, the soles of the feet, lips, nipples, and parts of the external reproductive organs. Hair develops from epidermal cells at the base of the hair follicle. A follicle is a tube-like structure that extends from the surface of the skin through the epidermis and into the dermis. The hair root is located in the follicle and extends into the skin. Blood vessels



from the dermis supply the hair follicle. As hair cells grow and divide, older cells are pushed toward the scalp. These cells become keratinized and die as they form the hair shaft. Hair and epidermal cells develop from the same stem cells.

2. Folliculitis is an inflammation of the hair follicle as a result of bacterial infection. It occurs commonly on the face of males as a result of daily shaving.
3. The most common type of baldness is pattern baldness in which hair on the top of the head is lost. It is also called male pattern baldness because it is associated with testosterone, an androgenic hormone. Alopecia areata is the result of antibodies that attack the hair follicles. Temporary hair loss can be a result of lowered estrogen levels associated with pregnancy. Certain medications can lead to hair loss, as can high fevers.
4. Baldness can be treated with minoxidil, a drug developed to treat hair loss. New hair growth continues only as long as the drug is taken. Hair transplants are a surgical approach to baldness that have met with varying success.
5. Genes determine hair color by directing the type and amount of pigment that melanocytes produce. Dark hair has more of the brownish-black eumelanin and blonde and red hair have more of the reddish-yellow pheomelanin.

C. Cold or strong emotion stimulates the arrector pili muscle at the base of a hair follicle to contract resulting in "goose bumps."

#### D. Nails

1. The lunula, the white half-moon-shaped area at the base of the nail, is the active, growing part of the nail.
2. Various system conditions produce changes in the appearance of nails. Spoon nails, with a depression in the middle of the nail, are associated with anemia. Lindsay's nails, white on the bottom, red or pink in the top half are associated with chronic renal failure. Beau's nails, a series of lines parallel to the lunula, are associated with serious renal and hepatic infections. These are only a few of the nail changes associated with chronic diseases. When found, they raise the clinician's suspicions for the associated diseases.

#### E. Skin Glands

Sebaceous glands are holocrine glands located near hair follicles and secrete a fatty material, sebum. Sebum keeps the hair follicle and skin soft and pliable and waterproof.

4. F. Sweat glands are either apocrine or eccrine. Apocrine glands are located in the axilla and the genitalia, are activated at puberty, and produce a scent. They open into hair follicles. Eccrine glands are the most numerous



sweat glands, are common in the face, neck and back and produce sweat in response to an increase in body temperature and to emotional stress.

5. G. Just before puberty, the adrenal glands increase their production of androgens, which in turn stimulates increased production of sebum. Acne develops when sebum clogs the ducts of sebaceous glands, producing blackheads and whiteheads, or comedones. The clogged sebaceous gland provides an environment in which anaerobic bacteria trigger an inflammatory response. Acne is treated with a variety of topical agents such as benzoyl peroxide, antibiotics, tretinoin, or salicylates. Systemic antibiotics are used to treat inflammatory acne. Birth control pills counter androgen excess and have been used successfully.