

5

Integumentary System

I. The Integument as an Organ

☞ *Concept:* The integument (skin) is the largest organ of the body, and together with its accessory organs (hair, glands, and nails), it constitutes the integumentary system. In certain areas of the body, it has adaptive modifications that accommodate protective or metabolic functions. In its role as a dynamic interface between the continually changing external environment, the skin helps to maintain homeostasis.

A. Multiple Choice Questions

- ___ 1. Which statement concerning the integument is *incorrect*?
- (a) It is the largest organ of the body.
 - (b) Its appearance and condition are clinically important.
 - (c) It protects the body and helps to regulate its function.
 - (d) It is of uniform thickness.
- ___ 2. Which are accessory structures of the integument?
- (a) sweat glands
 - (b) fingernails
 - (c) sebaceous glands
 - (d) all of the above
- ___ 3. The skin is thinnest on
- (a) the back of the hand.
 - (b) the tympanum.
 - (c) the ankle.
 - (d) the scalp.
- ___ 4. Which skin property is generally *not* of clinical importance?
- (a) color
 - (b) texture
 - (c) temperature
 - (d) distribution of melanin

B. True–False Questions

- ___ 1. The integument is the largest organ of the body.
- ___ 2. Fingernails are not considered part of the integumentary system.
- ___ 3. The integument is of uniform thickness over the entire body.

II. Layers of the Integument

☞ *Concept:* The integument consists of two principal layers. The outer epidermis is stratified into four or five structural layers, and the thick and deeper dermis consists of two layers. The hypodermis (subcutaneous tissue) connects the skin to underlying organs.

A. Multiple Choice Questions

- ___ 1. The epidermal layer associated with cellular death and the initiation of keratinization is
- (a) the stratum spinosum.
 - (b) the stratum granulosum.
 - (c) the stratum lucidum.
 - (d) the stratum corneum.

- _____ 2. The epidermal layer that is found only in the palms of the hands and the soles of the feet is
 (a) the stratum granulosum. (c) the stratum corneum.
 (b) the stratum spinosum. (d) the stratum lucidum.
- _____ 3. A needle would pierce the epidermal layers of the forearm in which order?
 (a) basale, spinosum, granulosum, corneum
 (b) basale, spinosum, granulosum, lucidum, corneum
 (c) granulosum, basale, spinosum, corneum
 (d) corneum, granulosum, spinosum, basale
- _____ 4. Which substance is *not* responsible for skin color?
 (a) carotene (c) keratin
 (b) melanin (d) hemoglobin
- _____ 5. Linea albicantes, or stretch marks, are due to tearing of
 (a) the reticular layer. (c) the papillary layer.
 (b) the elastic layer. (d) the hypodermal layer.
- _____ 6. Adipose cells are found in
 (a) the papillary layer. (c) the reticular layer.
 (b) the hypodermis. (d) the adipal layer.
- _____ 7. Which of the following is a *false* statement concerning the hypodermis?
 (a) It is thicker in males than in females.
 (b) It has abundant loose connective tissue.
 (c) It stores lipids.
 (d) It binds the dermis to underlying structures.

B. True–False Questions

- _____ 1. All races have virtually the same number of melanocytes.
- _____ 2. All races have virtually the same amount of melanin.
- _____ 3. Friction ridges are caused by the pull of elastic fibers within the dermis.
- _____ 4. Flexion lines are inherited.
- _____ 5. There are many more elastic fibers in the dermis of an elderly person than in the dermis of a young person.
- _____ 6. Vasodilation and vasoconstriction of blood vessels in the dermis regulate body temperature.

III. Functions of the Integument

☞ *Concept:* The integument not only protects the body from pathogens and external injury, it is a highly dynamic organ that plays a key role in maintaining body homeostasis.

A. Multiple Choice Questions

- _____ 1. Dehydration of terrestrial animals is prevented in part by
 (a) vasoconstriction of blood vessels.
 (b) keratinization of epidermal cells.
 (c) cornification of epidermal cells.
 (d) both b and c.

- _____ 2. Heat loss is associated with
 (a) secretion of sweat.
 (b) conduction of heat directly through the skin.
 (c) radiation from dilated blood vessels.
 (d) all of the above.
- _____ 3. Which muscles are attached to the hair follicles and cause goose bumps?
 (a) arrectores integumentum (c) levatores folliculum
 (b) arrectores pilorum (d) arrectores folliculum
- _____ 4. Which vitamin is synthesized in the skin in the presence of ultraviolet light?
 (a) vitamin D (c) vitamin A
 (b) vitamin E (d) vitamin K

B. True–False Questions

- _____ 1. The oily secretions of the skin form a protective alkaline film.
- _____ 2. The integument plays an important role in communication.

IV. Epidermal Derivatives

☞ *Concept:* Hair, nails, and integumentary glands form from the epidermal layer, and are therefore of ectodermal derivation. Hair and nails are structural features of the integument and have a limited functional role. By contrast, integumentary glands are extremely important in body defense and maintenance of homeostasis.

A. Multiple Choice Questions

- _____ 1. Which is *not* part of a hair?
 (a) shaft (c) follicle
 (b) root (d) bulb
- _____ 2. Hair color is determined by
 (a) the type of pigment produced in the stratum basale.
 (b) the amount of pigment produced in the stratum basale.
 (c) air spaces in the hair shaft.
 (d) all of the above.
- _____ 3. Arrector pili muscles are
 (a) skeletal muscles. (c) involuntary smooth muscles.
 (b) follicle glands. (d) voluntary smooth muscles.
- _____ 4. Fetal hair is referred to as
 (a) definitive. (c) nondefinitive.
 (b) angora. (d) lanugo.
- _____ 5. A man's beard consists of which type of hair?
 (a) definitive (c) nondefinitive
 (b) angora (d) lanugo
- _____ 6. Sebaceous glands secrete
 (a) oil. (c) wax.
 (b) sweat. (d) melanin.

B. True–False Questions

- ___ 1. Men and women have about the same density of hair on their bodies.
- ___ 2. Hair texture is determined by its cross-sectional shape.
- ___ 3. Lanugo is the soft, smooth hair on an infant.
- ___ 4. Apocrine glands are found in the palms of the hands.
- ___ 5. Mammary glands are specialized sudoriferous glands.

V. Developmental Exposition of the Integumentary System

A. Multiple Choice Questions

- ___ 1. During prenatal development, hair, glands, and nails form from
 - (a) mesoderm.
 - (b) mesenchyme.
 - (c) endoderm.
 - (d) ectoderm.
- ___ 2. The dermis is derived from
 - (a) mesoderm.
 - (b) endoderm.
 - (c) ectoderm.
 - (d) periderm.
- ___ 3. At 6 weeks, the ectodermal layer differentiates into
 - (a) the periderm and vernix caseosa.
 - (b) the germinal layer and vernix caseosa.
 - (c) the periderm and germinal layers.
 - (d) the basal and germinal layers.
- ___ 4. Which gives rise to the entire epidermis and associated structures?
 - (a) the periderm
 - (b) the germinal layer
 - (c) the mesenchyme
 - (d) the vernix caseosa
- ___ 5. Which of the following structures is (are) associated with the development of hair follicles?
 - (a) hair papilla
 - (b) germinal matrix
 - (c) mesenchyme and epithelial cells
 - (d) all of the above

B. True–False Questions

- ___ 1. The epidermis, hair, glands, and nails all develop from the ectodermal germ layer.
- ___ 2. The periderm eventually becomes the vernix caseosa in prenatal development.
- ___ 3. Melanoblasts produce the dark pigment melanin.
- ___ 4. Sebaceous glands are actually oil glands.
- ___ 5. Mammary glands are modified sebaceous glands.

VI. Clinical Considerations

A. Multiple Choice Questions

- ___ 1. Which skin disease is potentially life threatening?
(a) psoriasis (c) erythema
(b) melanoma (d) dermatitis
- ___ 2. What is the deepest layer affected by a second-degree burn?
(a) stratum basale (c) dermis
(b) epidermis (d) hypodermis
- ___ 3. Blisters followed by complete recovery are characteristic of
(a) first-degree burns. (c) third-degree burns.
(b) second-degree burns. (d) both a and b.

B. True–False Questions

- ___ 1. A successful skin transplant is rare because blood flow in the new tissue never becomes well established.
- ___ 2. Inflammation in an injured area confines the injury and promotes healing.
- ___ 3. Granulation tissue is formed from fibroblasts.

C. Completion Questions

1. In a severe wound, granulation tissue develops into _____ tissue.
2. Brown, plaquelike patches called _____ are typical on the exposed portions of the skin of elderly people.
3. Baldness, or _____, is due to genetic factors.
4. _____ is a type of skin cancer involving melanocytes.

D. Matching Questions

Match the clinical term or condition on the left with its description on the right.

- | | |
|-------------------|------------------------------------|
| ___ 1. frostbite | (a) mole |
| ___ 2. acne | (b) benign epithelial neoplasm |
| ___ 3. nevus | (c) baldness |
| ___ 4. carbuncle | (d) bacterial infection |
| ___ 5. furuncle | (e) itching |
| ___ 6. comedo | (f) frozen skin |
| ___ 7. albinism | (g) plug of sebum in hair follicle |
| ___ 8. cold sore | (h) no melanin synthesis |
| ___ 9. alopecia | (i) boil |
| ___ 10. pruritis | (j) herpes simplex virus |
| ___ 11. papilloma | (k) inflammatory sebaceous glands |

VII. Chapter Review

A. Completion Questions

1. The epidermis of the skin derives from the embryonic _____, whereas the dermis derives from the _____.
2. The integument (skin) is considered an _____ and accounts for approximately _____ % of a person's weight.
3. The epidermis of the skin is protective because of the process of _____, which occurs in the stratum granulosum, and the process of _____, which occurs in the stratum corneum.
4. Pigment cells, called _____, occur in the stratum basale, where they produce dark coloration in response to ultraviolet rays.
5. A _____, or bedsore, is an open lesion on the skin.
6. When the body's heat-producing mechanism cannot keep pace with heat loss, _____ results.
7. After it is activated by ultraviolet light, the compound dehydrocholesterol found in the skin forms _____.
8. The _____ muscles attached to the hair follicles respond involuntarily to thermal or psychological stimuli.
9. Blocked _____ glands may become infected, resulting in acne.
10. _____ burns involve both the epidermis and dermis, causing blisters to appear. Recovery is usually complete, but slow.
11. The skin of a fetus is covered by the _____, which provides a protective cheeselike coat.
12. Normal skin color results from a combination of melanin, _____, and _____.
13. _____ is a bluish discoloration of the skin resulting from cardiovascular or respiratory problems.
14. Stretch marks, or _____, are white streaks on the skin resulting from a tearing of the dermis.
15. _____ is a condition characterized by excessive body and facial hair, especially in women.
16. The three layers of hair are the inner medulla, the middle _____, and the outer _____.

B. Matching Questions

Match the technical term on the left with its description on the right

- | | |
|---------------------|-------------------------------------|
| ___ 1. keratin | (a) secretes earwax |
| ___ 2. lunula | (b) bluish discoloration |
| ___ 3. carotene | (c) fetal hair |
| ___ 4. sebum | (d) quick, or undersurface, of nail |
| ___ 5. hyponchium | (e) lipid secretion |
| ___ 6. lanugo | (f) yellowish pigment |
| ___ 7. sudoriferous | (g) crescent-shaped area of nail |
| ___ 8. cyanosis | (h) produced from tyrosine |
| ___ 9. ceruminous | (i) waterproofing protein |
| ___ 10. melanin | (j) secretes perspiration |