
Chapter 05: Integumentary System

Instructor’s Manual

ANSWERS TO TEXTBOOK CHAPTER QUIZ

Recall:
1. G
2. J
3. I
4. E
5. D
6. C
7. A
8. B
9. F
10. H

Thought:
1. A
2. D
3. C
4. A
5. B

Application:
1. The arrangement of connective tissue fibers in the reticular (bottom) layer of the dermis produces cleavage lines. Incisions that are parallel to the cleavage lines tend to gape less and produce less scar tissue than those that are across cleavage lines.

ANSWERS TO TEXTBOOK VOCABULARY QUIZ
1. melanoma
2. hyponychium
3. onychiecomy
4. hyperdermis
5. melanocyte
6. thick skin
7. fungal condition
8. surgical repair of the skin
9. study of the skin
10. a condition of producing no sweat
11. C
12. E
13. B
ANSWERS TO STUDY GUIDE LEARNING EXERCISES

Structure of the Skin
1. The integumentary system includes skin, hair, nails, and glands.
2. Hypodermis (Referral to as the subcutaneous layer)
   - Stratum basale (Specific layer that contains melanocytes)
   - Stratum basale (Epidermal layer next to the dermis)
   - Stratum germinativum (Consists of stratum basale and stratum spinosum)
   - Dermis (Consists of a papillary layer and reticular layer)
   - Stratum spinosum (Layer immediately above the stratum basale)
   - Hypodermis (Referral to as superficial fascia)
   - Stratum lucidum (Found only in thick skin)
   - Stratum granulosum (Keratinization begins in this layer)
   - Stratum corneum (Consists of dead, completely keratinized cells)
   - Dermis (Layer in which hair, nails, and glands are embedded)
   - Dermis (Contains receptors for temperature and touch)
   - Hypodermis (Contains adipose tissue)
   - Stratum basale (Actively mitotic layer)
   - Dermis (Has collagen fibers that give strength to the skin)

Skin Color
1. Melanin
2. Carotene
3. Blood vessels in the dermis
4. As cells with increased melanin are pushed to the surface, die, and are sloughed off, the tan lightens because the new cells do not have as much melanin.

Epidermal Derivatives
1. Follicle (Tubular sheath surrounding the hair root)
   - Arrector pili (Smooth muscle associated with hair)
   - Stratum basale (Epidermal layer that produces hair and nails)
   - Medulla (Central core of a hair)
   - Lunula (Crescent-shaped area over the nail matrix)
   - Sebaceous (Type of gland generally associated with hair)
   - Ceruminous (Glands that produce earwax)
   - Merocrine (Sweat glands that function in temperature regulation)
   - Sudoriferous (Another name for sweat glands)
   - Bulb (Enlarged region of hair follicle imbedded in dermis)
Eponychium (Another name for nail cuticle)
Apocrine (Large sweat glands in the axilla)

Functions of the Skin
1. (in any order)
   (a) protection
   (b) sensory reception,
   (c) regulation of body temperature
   (d) synthesis of vitamin D
2. Keratin
3. Oily secretions of sebaceous glands
4. Melanin
5. Dermis
6. (a) Blood vessels dilate to bring more blood to the surface to radiate heat from the body. In cold, they constrict to conserve heat inside the body.
   (b) In heat, sweat glands actively produce perspiration, which carries large quantities of heat to the surface. Evaporation then cools the body. In cold, sweat glands are inactive.
7. Precursors for vitamin D are in the skin and when exposed to ultraviolet from the sun, vitamin D is formed.

Burns
1. 3 (Requires skin grafts)
2, 3 (Stratum basale damaged)
1 (Heals by regeneration)
1, 2 (Becomes red)
3 (Involves subcutaneous tissue)
1, 2 (Painful)
2 (Blisters)
1 (Superficial)
2 (May produce scarring)
2, 3 (Involves the dermis)
3 (Severe scarring)
3 (Nerve endings destroyed)
2. (a) 27%
   (b) Infection and fluid loss

ANSWERS TO STUDY GUIDE LABELING AND COLORING EXERCISES
1. C (Arrector pili muscle)
   H (Blood vessel)
   A (Epidermis)
   G (Hair bulb)
   F (Sebaceous gland)
   B (Stratum basale)
   E (Stratum corneum)
   D (Sweat gland)
2. A. Cuticle  
   B. Cortex  
   C. Medulla  
   D. Papilla  
   E. Hair bulb  
   F. Hair follicle  
3. A. Nail root  
   B. Eponychium (cuticle)  
   C. Lunula  
   D. Nail body  

ANSWERS TO STUDY GUIDE VOCABULARY PRACTICE  
A. 1. C  
   2. A  
   3. G  
   4. E  
   5. H  
   6. F  
   7. B  
   8. J  
B. 1. ultraviolet  
   2. biopsy  
   3. fever of unknown origin  
   4. herpes simplex virus  
   5. purified protein derivative  
C. 1. √  
   2. √  
   3. keratinization  
   4. sebaceous  
   5. √  
   6. corneum or corium  
   7. lucidum  
   8. arrector pili  
   9. √  
   10. ceruminous  
D. 1. wax  
   2. sweat  
   3. scaly, dry  
   4. nail  
   5. surgical excision  
   6. surgical repair  
   7. dry  
   8. killing  
   9. blue  
   10. louse, lice  
E. 1. hidr = sweat; aden = gland; itis = inflammation
hidreadenitis = inflammation of a sweat gland
2. myco = fungus; derm = skin; itis = inflammation
   mycoadenitis = inflammation of the skin caused by a fungus

F. 1. bactericide
   2. subcutaneous
   3. appendectomy
   4. anhidrosis
   5. mycosis
   6. pachyderma
   7. xeroderma
   8. hyponychium
   9. rhytidoplasty
  10. pediculosis

G. 1. A melanocyte is a cell that produces the dark or black pigment melanin.
   2. Onychomycosis is a fungal infection of the nails
   3. Trichomycosis is a fungal infection of the hair.
   4. Cyanosis is a bluish discoloration of the skin due to a lack of oxygen.
   5. Erythema is a widespread redness of the skin.

ANSWERS TO STUDY GUIDE REVIEW QUESTIONS

1. Skin, glands, hair, nails
2. Epidermis: outer layer of skin, composed of stratified squamous epithelium.
   Dermis: inner layer of skin, composed of connective tissue with epidermal derivatives embedded in it.
   Hypodermis: anchors the skin to underlying tissues; also called subcutaneous tissue or superficial fascia.
3. Stratum corneum: surface region of the epidermis composed of 20 to 30 layers of flattened, dead, keratinized cells.
   Stratum lucidum: a clear or translucent band of cells just beneath the stratum corneum; found only in thick skin.
   Stratum granulosum: Two or three layers of flattened cells where keratinization begins so the cells appear granular.
   Stratum spinosum: Several layers of cells beneath the stratum granulosum; cells have spiny projections and have limited mitotic ability.
   Stratum basale: Bottom row of cells, columnar in shape and next to the dermis; actively mitotic layer; also contains melanocytes.
4. Upper papillary layer has numerous projections, or papillae, that extend into the epidermis. These contain blood vessels, nerve endings, and sensory receptors.
   Lower reticular layer is thicker than the papillary layer and has an abundance of connective tissue fibers to provide strength and resistance.
5. Hypodermis anchors the skin to underlying organs. Adipose in the hypodermis acts as a cushion against mechanical shock, as an insulator in temperature regulation, and can be used as an energy source.
6. The skin functions in temperature regulation through the constriction and dilation of cutaneous blood vessels and the activity of the sweat glands. When temperature increases, blood vessels dilate to bring more blood to the surface so the heat can be
dissipated. When temperature decreases, the vessels constrict to retain heat in the body. When temperature increases, the sweat glands become more active and the evaporation of the perspiration cools the body.

7. Amount of melanin is the primary factor that influences skin color. Two other factors are the yellow pigment carotene and the blood in the dermal blood vessels.

8. Stratum basale of the epidermis.

9. The shaft of the hair is the visible portion and the root is the portion embedded in the skin. The central core of the hair is the medulla, which is surrounded by several layers of cells that are the cortex. This is covered by a single layer of overlapping keratinized cells called the cuticle. The root is enclosed in a hair follicle, which expands at the base to form a hair bulb. This surrounds a papilla, which is a projection of dermis with blood vessels. An arrector pili muscle is attached to the root.

10. The visible portion of a nail is the nail body. The distal end is the free edge and the portion that is covered with skin is the nail root. The fold of skin that covers the proximal portion of the nail body is the eponychium. Stratum basale from the epidermis grows under the nail body to form the nail bed. This is thickened at the proximal end to form the nail matrix. The portion of the nail body that is over the matrix appears lighter in color and is called the lunula.

11. Sebaceous glands are generally associated with hair follicles and open into the follicles. They secrete sebum to keep hair and skin soft and pliable. Sebum also helps prevent fluid loss.

12. Sudoriferous glands are sweat glands. Merocrine glands are more numerous and more widely distributed than apocrine glands. Their secretion is a watery fluid with a few salts that is secreted in response to increased temperature and emotional stress. Apocrine glands are larger than merocrine and are limited to the axillae and external genitalia where the ducts open into hair follicles. Secretory product contains organic compounds and is released in response to pain, emotional stress, and sexual arousal.

13. Ceruminous glands are modified sweat glands in the external auditory canal. They secrete a waxy substance called cerumen.

14. Protection against water loss, ultraviolet light, invading organisms, and injuries; sensory reception; temperature regulation; vitamin D synthesis.

15. Infection and fluid loss

16. First- and second-degree burns are painful.

17. First degree: epidermis
   Second degree: epidermis and a portion of the dermis
   Third degree: all of the epidermis and dermis; extends into subcutaneous tissue.

**ANSWERS TO STUDY GUIDE FUNCTIONAL RELATIONSHIPS**

1. H
2. C
3. G
4. A
5. E
6. F
7. D
8. J
9. B  
10. I  
Skeletal: Synthesizes vitamin D for calcium absorption for bone maintenance  
Cardiovascular: Prevents fluid loss from the blood.  
Muscular: Synthesizes vitamin D for calcium absorption necessary for muscle contraction  
Reproductive: Skin forms scrotum that protects testes.  
Endocrine: Synthesizes vitamin D for the absorption of calcium, which acts as a messenger in some hormone actions  
Respiratory: Hairs of nasal cavity filter particles that damage upper respiratory tract.  
Nervous: Dermis contains receptors for touch, temperature, pressure, and pain.  
Lymphatic: Prevents pathogen entry; connective tissue cells in skin activate immune response.  
Digestive: Provided vitamin D for intestinal absorption of calcium.  
Urinary: Alternative excretory route for some salts and nitrogenous wastes.  

ANSWERS TO STUDY GUIDE REPRESENTATIVE DISORDERS  
1. B  
2. J  
3. G  
4. D  
5. A  
6. F  
7. I  
8. E  
9. C  
10. H  

ANSWERS TO STUDY GUIDE TESTING COMPREHENSION  
1. d  
2. a  
3. c  
4. b  
5. d  
6. a  
7. c  
8. b  
9. a  
10. c  
11. d  
12. a  
13. d  
14. c  
15. a  
16. b  
17. b  
18. c
19. b
20. d
21. a
22. d
23. c
24. b
25. c

ANSWERS TO STUDY GUIDE FUN AND GAMES

Word Scramble
1. stratum corneum
2. keratin
3. sebaceous glands
4. eponychium
5. hypodermis
Term for final definition: integumentary system
6. albinism
7. carotene
8. cerumen
9. sweat glands
Term for final definition: stratum basale