

Answer Key for PAL™ 3.0 Lab Guide

1 The Integumentary System

Gross Anatomy of the Integumentary System

Anatomical Models Self Review

Exercise 1.1

- | | |
|-------------------------|-----------------------|
| A. Hair shaft | F. Hypodermis |
| B. Hair root | G. Pacinian corpuscle |
| C. Arrector pili muscle | H. Sudoriferous gland |
| D. Epidermis | I. Hair follicle |
| E. Meissner's corpuscle | J. Sebaceous gland |

Exercise 1.2

- | | |
|-------------------------------|--|
| A. Stratum corneum | F. Stratum basale/stratum germinativum |
| B. Stratum lucidum | G. Papillary layer of dermis |
| C. Stratum granulosum | H. Reticular layer of dermis |
| D. Duct of sudoriferous gland | I. Meissner's corpuscle |
| E. Stratum spinosum | |

Anatomical Models Quiz

Check Your Understanding

1. Shaft and root
2. Papillary layer
3. Stratum basale (germinativum), stratum spinosum, stratum granulosum, stratum lucidum, stratum corneum
4. Eccrine sweat glands (merocrine sweat glands)
5. Connective tissue root sheath and epithelial root sheath
6. Keratin and water-resistant glycolipids; stratum granulosum
7. Hair follicle receptor
8. Sebum is the oily secretion of sebaceous glands. It lubricates and softens skin and hair. Because sebum is acidic, it also inhibits bacterial growth.
9. g. hair follicle
d. dermis
e. palm
b. arrector pili
a. sebaceous gland
c. axilla
f. stratum granulosum

Apply What You Learned

1. Burns may occur after exposure to:
Heat
Radiation
Electricity
Chemicals
First-degree burn (partial-thickness burn): Epidermis only; redness, swelling, and pain; 2–3 days to heal.
Second-degree burn (partial-thickness burn): Epidermis and upper dermis; redness, swelling, pain and blisters; 3–4 weeks to heal.
Third-degree burn (full-thickness burn): Epidermis and dermis; grayish white, bright red, or black in color; no edema at first; no pain at first due to damage to neurons and receptors in the dermis; grafts necessary; long time to heal.
2. melanocytes; A - asymmetry, B - border irregularity, C - color, D - diameter, E - elevation; melanoma can spread to nearby lymph nodes deep to the skin.

Tissues of the Integumentary System

Histology Self Review

Exercise 1.3

- A. Epidermis
- B. Dermis
- C. Hypodermis
- D. Adipocytes (fat cells)
- E. Pacinian corpuscle
- F. Eccrine sweat gland
- G. Blood vessels

Exercise 1.4

- A. Dermis
- B. Hypodermis
- C. Adipocytes (fat cells)
- D. Collagen fibers
- E. Pacinian corpuscle
- F. Eccrine sweat glands
- G. Eccrine ducts
- H. Blood vessel

Exercise 1.5

- A. Stratum corneum
- B. Stratum granulosum
- C. Stratum spinosum
- D. Stratum basale
- E. Reticular layer of dermis
- F. Stratum lucidum
- G. Meissner's corpuscle
- H. Papillary layer of dermis

Exercise 1.6

- A. Meissner's corpuscle
- B. Stratum basale

Exercise 1.7

- A. Concentric layers of connective tissue
- B. Unmyelinated nerve ending

Exercise 1.8

- A. Follicle wall
- B. Arrector pili muscle
- C. Eccrine sweat gland
- D. Sebaceous gland
- E. Epidermis

Exercise 1.9

- A. Hair shaft
- B. Hair root
- C. Matrix
- D. Papilla
- E. Follicle wall

Exercise 1.10

- A. Connective tissue root sheath
- B. Hair shaft
- C. Internal root sheath
- D. External root sheath

Exercise 1.11

- A. Epidermis
- B. Collagen fibers in dermis
- C. Lumen of hair follicle
- D. Sebaceous glands

Exercise 1.12

- A. Stratified squamous epithelium, keratinized
- B. Dermal papilla
- C. Basement membrane

Histology Quiz

Check Your Understanding

1. Dense irregular connective tissue
2. Stratum corneum and stratum lucidum
3. Papillary layer
4. Pacinian corpuscle
5. Epidermis
6. Keratinocytes; stratum basale (stratum germinativum)
7. Precursor of vitamin D (cholecalciferol); vitamin D is necessary for the absorption of calcium across the small intestine. Calcium is essential to many physiological processes including the hardening (calcification) of bone, muscle contraction, neurotransmitter release from neurons, and blood clotting, to name a few.

8. 1. d.
2. a.
3. e.
4. c.
5. b.

Apply What You Learned

1. UV radiation damages deoxyribonucleic acid (DNA) by chemically altering the bases within DNA. This changes its three-dimensional structure and prevents the accurate replication and transcription of DNA. Further, a gene that codes for a tumor suppressor protein is particularly vulnerable to UV radiation. The visible effects of UV radiation are sunburns, wrinkles, and skin cancer. Some skin cancers, like melanomas, are particularly aggressive and metastatic.
2. Hair grows on all of the sites listed for the occurrence of acne (i.e., face, neck, chest, back, and shoulders). Sebaceous glands, which produce the sebum that contributes to the clogged pore, are associated with the hair follicles at these sites. Hair follicles are absent in the palm and the sole, hence there is no occurrence of acne at these sites.

Integumentary System Lab Practical

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|-------------------------|--------------------------|
| 1. Meissner's corpuscle | 11. Stratum spinosum |
| 2. Stratum granulosum | 12. Meissner's corpuscle |
| 3. Papillary layer | 13. Follicle wall |
| 4. Epidermis | 14. Arrector pili muscle |
| 5. Dermis | 15. Sebaceous gland |
| 6. Hypodermis | 16. Hair root |
| 7. Pacinian corpuscle | 17. Matrix |
| 8. Eccrine sweat glands | 18. Papilla |
| 9. Blood vessel | 19. Sebaceous gland |
| 10. Stratum corneum | 20. Arrector pili muscle |