

# ANSWERS TO CHAPTER 5

## CONTENT LEARNING ACTIVITY

### Hypodermis

1. Hypodermis; 2. Hypodermis; 3. Fat; 4. Fat

### Dermis

1. Cleavage lines; 2. Striae; 3. Dermal papillae; 4. Dermal papillae

### Epidermis

1. Keratinization; 2. Stratum basale; 3. Stratum corneum; 4. Keratin; 5. Lipids; 6. Callus; 7. Corn
1. Epidermis; 2. Dermis; 3. Stratum basale; 4. Stratum corneum

### Skin Color

1. Melanin; 2. Melanocytes; 3. Melanosomes; 4. Albinism; 5. Suntan; 6. Blue color; 7. Carotene; 8. Red color; 9. Cyanosis; 10. Birthmarks

### Hair

1. Hair shaft; 2. Medulla; 3. Cuticle; 4. Hair follicle; 5. Arrector pili
1. Hair shaft; 2. Hair root; 3. Hair bulb; 4. Dermal papilla; 5. Hair follicle wall; 6. Arrector pili; 7. Cuticle; 8. Cortex; 9. Medulla

### Glands

1. Sebum; 2. Sebaceous gland; 3. Merocrine sweat gland; 4. Apocrine sweat gland
1. Apocrine sweat gland; 2. Merocrine sweat gland; 3. Sebaceous gland

### Nails

1. Nail body; 2. Eponychium; 3. Nail matrix; 4. Lunula
1. Nail body; 2. Lunula; 3. Eponychium (cuticle); 4. Nail root; 5. Eponychium (cuticle); 6. Nail root; 7. Nail matrix; 8. Nail bed; 9. Nail body

### Functions of the Integumentary System

1. Protection; 2. Protection; 3. Protection; 4. Vitamin D production; 5. Temperature regulation; 6. Excretion

### The Effects of Aging on the Integumentary System

1. Decreases; 2. Decreases; 3. Decreases; 4. Decreases; 5. Decreases; 6. Decreases; 7. Decreases

### The Integumentary System as a Diagnostic Aid

1. Cyanosis; 2. Jaundice; 3. Rash

### Burns

1. Partial thickness burn; 2. First degree burn; 3. Second degree burn; 4. Full thickness burn

### Skin Cancer

1. Basal cell carcinoma; 2. Squamous cell carcinoma; 3. Malignant melanoma

## QUICK RECALL

1. Protection, sensation, vitamin D production, temperature regulation, and excretion.
2. Stratum basale and stratum corneum; keratinization
3. Melanin and carotene
4. Growth stage and resting stage
5. Sebaceous glands, merocrine sweat glands, and apocrine sweat glands
6. Protects against abrasion, ultraviolet light, water loss, entry of microorganisms
7. Increasing or decreasing blood flow through the skin; increased sweat production
8. Basal cell carcinoma, squamous cell carcinoma, and malignant melanoma

## WORD PARTS

1. subcutaneous
2. dermis; epidermis; hypodermis
3. keratin; keratinization
4. melanin; melanocytes
5. cyanosis
6. papillae

## MASTERY LEARNING ACTIVITY

1. A. The hypodermis connects the dermis to underlying bone and muscle. It is not part of the skin. Hair and nails are derived from the epidermis.
2. C. Epidermal cells are produced in the stratum basale, undergo keratinization, and end up in the stratum corneum.

3. C. The papillae are responsible for fingerprints. The papillae also have blood vessels that supply nourishment to the epidermis. The dermis is responsible for cleavage lines, and the hypodermis contains large fat deposits.
4. B. The heel of the foot is subjected to friction and has a thick stratum corneum. A callus or corn would be possible.
5. D. Keratin provides structural strength, lipids prevent water loss, melanin protects against ultraviolet light, and sebum lubricates the skin.
6. D. Cyanosis, a bluish skin color, is caused by deoxygenated blood.
7. C. Hair is columns of dead keratinized epithelial cells that were produced in the hair bulb (not the tip of the hair shaft). Hair grows in cycles: a growth state followed by a resting stage.
8. D. Hair follicles are extensions of the epidermis into the dermis. Both sebaceous and apocrine sweat glands empty into hair follicles.
9. D. Arrector pili are smooth muscle that produce "goose flesh" and make hair "stand on end."
10. A. Sebum is produced by sebaceous glands and lubricates hair and skin. Sweat glands produce a watery secretion (sweat) and secretions of apocrine sweat glands are involved in producing body odor.
11. B. An inability to produce sweat impairs body temperature regulation in warm environments. None of the skin's glands play an important role in secreting waste products. Sweat glands do not empty into hair follicles and play no role in flushing out secretions from hair follicles. Sebum prevents some bacteria from growing on the skin.
12. C. The nail grows from the nail matrix. Specifically, the nail matrix forms the nail root, which is pushed distally to become the nail body.
13. D. Exposure of the skin to ultraviolet light activates a precursor molecule that becomes vitamin D. Vitamin D is necessary for the normal uptake of calcium and phosphate from the small intestine.
14. B. Second degree burns are characterized by redness, blisters, edema, and pain.
15. C. The large, flat, spreading lesion indicates malignant melanoma. Death probably resulted from metastasis of the cancer.



## FINAL CHALLENGES



1. Alcohol is a solvent that dissolves lipids (see chapter 2). It removes the lipids from the skin, especially in the stratum corneum. Because these lipids normally prevent water loss, after soaking the hand in alcohol, the rate of water loss increases.
2. Carotene, a yellow pigment from ingested plants, accumulates in lipids. The stratum corneum of a callus has more layer of cells than other noncallused parts of the skin and the cells in each layer are surrounded by lipids. The carotene in the lipids makes the callus appear yellow.
3. The tattoo is located in the dermis; to remove the tattoo, the overlying epidermis and most of the dermis must be removed. The wound produced is much like a deep second degree burn. After removing the tattoo, considerable scar tissue forms because most of the epithelial tissue regeneration occurs from the edge of the wound.
4. Because body odor results from the breakdown of the organic secretions of apocrine sweat glands, one possibility is to remove the secretions by washing. Another method is to kill the bacteria. The aluminum salts in some antiperspirants do this. Antiperspirants also reduce the watery secretions of merocrine sweat glands, but these secretions are not the cause of body odor. Deodorants mask body odor with another scent, but do not prevent it.
5. Because the hair pulled out easily, the hair follicle has been destroyed. Because the hair follicle extends deep into the dermis, this indicates the epidermis and dermis have been destroyed. It is probably a third degree burn.