INTEGUMENTARY SYSTEM (SKIN)

Basic Functions of the Skin

3. The skin protects the body by providing three types of barriers. Classify each of the protective factors listed below as an example of a chemical barrier (C), a biological barrier (B), or a mechanical (physical) barrier (M).

- B 1. Langerhans' cells and macrophages
- M 2. Intact epidermis
- C 3. Bactericidal secretions
- C M 4. Keratin
- C 5. Melanin
- C 6. Acid mantle

4. In what way does a sunburn impair the body's ability to defend itself?

(Assume the sunburn is mild.) Sunburn inhibits the immune response by depressing macrophage activity.

5. Explain the role of sweat glands in maintaining body temperature homeostasis.

In your explanation, indicate how their activity is regulated. Body temp ↑, Sweat glands activate [neural fibers, sympathetic nervous system], sweat evaporates & carries heat with it

6. Complete the following statements. Insert your responses in the answer blanks.

Nervous 1. The cutaneous sensory receptors that reside in the skin are actually part of the (1) system. Four types of stimuli that can be detected by certain of the cutaneous receptors are(2), (3), (4), and (5).

Temperature 2. Pain

Pressure → Deep 3. Pressure → Light

Cholesterol 4. Vitamin D is synthesized when modified (6) molecules in the skin are irradiated by (7) light. Vitamin D is important in the absorption and metabolism of (8) ions.

UV (sun) 5.
Calcium 8.
Basic Structure of the Skin

7. Figure 4–2 depicts a longitudinal section of the skin. Label the skin structures and areas indicated by leader lines and brackets on the figure. Select different colors for the structures below and color the coding circles and the corresponding structures on the figure.

- Arrector pili muscle
- Adipose tissue
- Hair follicle
- Nerve fibers
- Sweat (sudoriferous) gland
- Sebaceous gland

Figure 4–2

8. The more superficial cells of the epidermis become less viable and ultimately die. What two factors account for this natural demise of the epidermal cells?

1. Further from dermis/nutrient supply
2. Waterproofing/keratinize
9. Using the key choices, choose all responses that apply to the following descriptions. Enter the appropriate letter(s) or term(s) in the answer blanks.

**Key Choices**

A. Stratum basale
B. Stratum corneum
C. Stratum granulosum
D. Stratum lucidum
E. Stratum spinosum
F. Papillary layer
G. Reticular layer
H. Epidermis as a whole
I. Whole Dermis

1. Translucent cells, containing keratin
   - **D**. Stratum lucidum

2. Strata containing all or mostly dead cells
   - **B**. Stratum corneum

3. Dermis layer responsible for fingerprints
   - **F**. Papillary

4. Vascular region
   - **I**. Whole Dermis

5. Epidermal region involved in rapid cell division; most inferior epidermal layer
   - **A**. Stratum basale

6. Scalelike cells full of keratin that constantly flake off
   - **B**. Stratum corneum

7. Site of elastic and collagen fibers
   - **I**. Whole Dermis

8. Site of melanin formation
   - **A**. Stratum basale

9. Major skin area from which the derivatives (hair, nails) arise
   - **B**. Stratum corneum

10. Epidermal layer containing the oldest cells
    - **I**. Whole Dermis

11. When tanned becomes leather
    - **B**. Stratum corneum

10. Circle the term that does not belong in each of the following groupings.

   1. Reticular layer
   - Keratin
   - Dermal papillae
   - Meissner's corpuscles

   2. Melanin
   - Freckle
   - Sun
   - Malignant melanoma

   3. Prickle cells
   - Stratum basale
   - Stratum spinosum
   - Cell shrinkage

   4. Langerhans' cells
   - Epidermal dendritic cells
   - Keratinocytes
   - Immune cells

   5. Meissner's corpuscles
   - Pacinian corpuscles
   - Merkel cells
   - Arrector pili

   6. Waterproof substance
   - Elastin
   - Lamellated granules
   - Produced by keratinocytes

   7. Intermediate filaments
   - Keratin fibrils
   - Keratohyaline
   - Lamellated granules
11. This exercise examines the relative importance of three pigments in determining skin color. Indicate which pigment is identified by the following descriptions by inserting the appropriate answer from the key choices in the answer blanks.

**Key Choices**

- A. Carotene
- B. Hemoglobin
- C. Melanin

1. Most responsible for the skin color of dark-skinned people
2. Provides an orange cast to the skin
3. Provides a natural sunscreen
4. Most responsible for the skin color of Caucasians
5. Phagocytized by keratinocytes
6. Found predominantly in the stratum corneum
7. Found within red blood cells in the blood vessels

12. Complete the following statements in the blanks provided.

- **Heat**
  1. Radiation from the skin surface and evaporation of sweat are two ways in which the skin helps to get rid of body **(1)**.

- **Subcutaneous**
  2. Fat in the **(2)** tissue layer beneath the dermis helps to insulate the body.

- **Vitamin D**
  3. A vitamin that is manufactured in the skin is **(3)**.

- **Elasticity**
  4. Wrinkling of the skin is caused by loss of the **(4)** of the skin.

- **Oxygen (Blood Flow)**
  5. A decubitus ulcer results when skin cells are deprived of **(5)**.

- **Cyanosis**
  6. **(6)** is a bluish cast of the skin resulting from inadequate oxygenation of the blood.

### Appendages of the Skin

13. For each true statement, write T. For each false statement, correct the underlined word(s) and insert your correction in the answer blank.

- **Sweat/Merocrine**
  1. A saltwater solution is secreted by sebaceous glands.

- **Keratin**
  2. The most abundant protein in dead epidermal structures such as hair and nails is melanin.

  **T.**

- **Sebum**
  3. Sebum is an oily mixture of lipids, cholesterol, and cell fragments.

- **Shaft**
  4. The externally observable part of a hair is called the root.

- **Dermis**
  5. The epidermis provides mechanical strength to the skin.
14. Figure 4-3 is a diagram of a cross-sectional view of a hair in its follicle. Complete this figure by following the directions in steps 1-3.

1. Identify the two portions of the follicle wall by placing the correct name of the sheath at the end of the appropriate leader line.

2. Use different colors to color these regions.

3. Label, color-code, and color the three following regions of the hair.
   - Cortex
   - Cuticle
   - Medulla

![Figure 4-3]

15. Circle the term that does not belong in each of the following groupings.

1. Luxuriant hair growth  Testosterone  Poor nutrition  Good blood supply
2. Vitamin D  Cholesterol  UV radiation  Keratin
3. Stratum corneum  Nail matrix  Hair bulb  Stratum basale
4. Scent glands  Eccrine glands  Apocrine glands  Axilla
5. Terminal hair  Vellus hair  Dark, coarse hair  Eyebrow hair

16. What is the scientific term for baldness? **Alopecia**
17. Using the key choices, complete the following statements. Insert the appropriate letter(s) or term(s) in the answer blanks.

**Key Choices**

A. Arrector pili  
B. Cutaneous receptors  
C. Hair  
D. Hair follicle(s)  
E. Sebaceous  
F. Sweat gland (apocrine)  
G. Sweat gland (eccrine)

1. A blackhead is an accumulation of oily material produced by ____(1)__. 
2. Tiny muscles attached to hair follicles that pull the hair upright during fright or cold are called ____(2)__. 
3. The most numerous variety of perspiration gland is the ____(3)__. 
4. A sheath formed of both epithelial and connective tissues is the ____(4)__. 
5. A less numerous variety of perspiration gland is the ____(5)__. Its secretion (often milky in appearance) contains proteins and other substances that favor bacterial growth. 
6. ____(6)__ is found everywhere on the body except the palms of the hands, soles of the feet, and lips, and it primarily consists of dead keratinized cells. 
7. ____(7)__ are specialized nerve endings that respond to temperature and touch, for example 
8. ____(8)__ become more active at puberty. 
9. Part of the heat-liberating apparatus of the body is the ____(9)__. 
10. Secretin contains bacteria-killing substances.

18. Circle the term that does not belong in each of the following groupings.

1. Sebaceous gland  
2. Radiation  
3. Stratum corneum  
4. Scent glands  
5. Cyanosis  
6. Hair  
7. Arrector pili  
8. Absorption  
9. Nails  
10. Erythema  
11. Evaporation  
12. Conduction  
13. Hair  
14. Stratum basale  
15. Eccrine glands  
16. Apocrine glands  
17. Axilla  
18. Wrinkles  
19. Pallor
Homeostatic Imbalances of the Skin

19. Overwhelming infection is one of the most important causes of death in burn patients. What is the other major problem they face, and what are its possible consequences?

Water/protein/electrolyte loss, circulatory collapse, renal shutdown

20. This section reviews the severity of burns. Using the key choices, select the correct burn type for each of the following descriptions. Enter the correct answers in the answer blanks.

Key Choices

A. First-degree burn  B. Second-degree burn  C. Third-degree burn

C. 3° Burn

1. Full-thickness burn; epidermal and dermal layers destroyed; skin is blanched

B. 2° Burn

2. Blisters form

A. 1° Burn

3. Epidermal damage, redness, and some pain (usually brief)

B. 2° Burn

4. Epidermal and some dermal damage; pain; regeneration is possible

C. 3° Burn

5. Regeneration impossible; requires grafting

C. 3° Burn

6. Pain is absent because nerve endings in the area are destroyed

21. What is the importance of the “rule of nines” in treatment of burn patients?

Allows estimation of the extent of burns so that fluid volume replacement can be calculated correctly

22. Fill in the type of skin cancer that matches each of the following descriptions:

Squamous Cell Carcinoma

1. Epithelial cells, not in contact with the basement membrane, develop lesions; metastasize

Basal Cell Carcinoma

2. Cells of the lowest level of the epidermis invade the dermis and hypodermis; exposed areas develop ulcer; slow to metastasize

Malignant Melanoma

3. Rare but often deadly cancer of pigment-producing cells

23. What does ABCD mean in reference to examination of pigmented areas?

A. asymmetrical
B. border (irregular)
C. color (changing or multicolored)
D. diameter (larger than pencil eraser)
Part I: Objective-Based Questions

**OBJECTIVE 1** Describe the general functions of the integumentary system.

1. The two functional components of the integument include
   - a. dermis and epidermis.
   - b. hair and skin.
   - c. cutaneous membrane and accessory structures.
   - d. elastin and keratin.

2. Regulating heat exchange with the environment is the mechanism that the skin uses to
   - a. maintain normal body temperature.
   - b. prevent excessive loss of body fluids.
   - c. maintain large reserves of lipids.
   - d. transmit information to the nervous system.

3. The structure(s) of the integumentary system involved in protection is(are)
   - a. hair.
   - b. skin.
   - c. nails.
   - d. all of the above.

4. All of the following are functions of the integumentary system except
   - a. protection of underlying tissue.
   - b. synthesis of vitamin A.
   - c. maintenance of body temperature.
   - d. excretion.

5. Receptors in the skin represent the
   - a. method by which body temperature is maintained.
   - b. release of chemicals from metabolism.
   - c. areas of synthesis and storage of nutrients.
   - d. link between the integument and the nervous system.

**OBJECTIVE 2** Describe the main structural features of the epidermis, and explain their functional significance.

1. The layers of the epidermis, beginning with the deepest layer and proceeding outwardly, include the strata
   - a. corneum, granulosum, spinosum, germinativum.
   - b. granulosum, spinosum, germinativum, corneum.
   - c. spinosum, germinativum, corneum, granulosum.
   - d. germinativum, spinosum, granulosum, corneum.

2. Stem cells and melanocytes dominate the stratum germinativum, making it the layer where
   - a. new cells are generated and skin colors are synthesized.
   - b. the protein keratin produces cornified cells.
   - c. dead epithelial cells accumulate in large amounts.
   - d. the cells are flattened, densely packed, and filled with keratin.
3. Epidermal cells in the stratum spinosum and stratum germinativum function as chemical factories in that they can convert
   a. steroid precursors to vitamin D when exposed to sunlight.
   b. eleidin to keratin.
   c. keratohyalin to eleidin.
   d. a and c only

4. The two pigments contained in the epidermis in variable amounts are
   a. melanin and keratin.
   b. carotene and keratin.
   c. vitamin D and melanin.
   d. carotene and melanin.

5. Keratin, a fibrous protein, would be found primarily in the **S. corneum**
6. The layer where the skin is thick, such as the palms of the hands and the soles of the feet, is called the **S. lucidum**

**Labeling Exercise**

Identify the various components of the integumentary system in Figure 5-1. Place your answers in the spaces provided on the following page.

**FIGURE 5-1 Components of the Integumentary System**
1. epidermis
2. dermis
3. hypodermis
4. hair shaft
5. sebaceous gland
6. smooth muscle
7. hair follicle
8. touch pressure receptor
9. nerve fiber
10. sweat gland
11. blood vessel
12. arteriole

**OBJECTIVE 3** Explain what accounts for individual differences in skin, such as skin color.

1. Differences in skin color among individuals reflect
   a. numbers of melanocytes.
   b. melanocyte distribution patterns.
   c. levels of melanin synthesis.
   d. UV responses and nuclear activity.

2. Dermal blood supply and epidermal pigmentation are the two basic factors interacting to
   a. produce melanocytes and provide skin coloration.
   b. provide oxygen and carbon dioxide for skin respiration.
   c. produce skin pigments and avoid albinism.
   d. produce skin color.

3. Even though melanocytes are of normal abundance and distribution, in the inherited condition of albinism
   a. melanin is not produced by the melanocytes.
   b. sunlight inhibits production of melanin.
   c. there is a decrease in blood supply to the skin.
   d. melanocytes are destroyed before they mature.

4. Some people only “burn” when exposed to the sun. The reason they don’t tan is that
   a. they do not have a gene for tanning.
   b. their melanocytes are inactive.
   c. they don’t have a sufficient number of melanocytes.
   d. all of the above are true.

5. Albinos have
   a. no melanocytes.
   b. fewer melanocytes than non-albinos.
   c. the same number of melanocytes as non-albinos.
   d. overactive melanocytes.

6. Small amounts of ultraviolet (UV) radiation are beneficial because it stimulates the synthesis of ___.
   a. UV-D3
   b. UV-C
   c. UV-A
   d. UV-B

7. The pigment that absorbs ultraviolet radiation before it can damage mitochondrial DNA is ___.
OBJECTIVE 4 Describe how the integumentary system helps to regulate body temperature.

1. Cooling the surface of the skin and producing perspiration is the primary function of
   a. ceruminous gland activity.
   b. sebaceous gland activity.
   c. apocrine gland activity.
   d. merocrine gland activity.

2. If body temperature drops below normal, heat is conserved by ____________ in the
diameter of dermal blood vessels.
   a. an increase
   b. no change
   c. a decrease
   d. None of the above are correct.

3. When body temperature becomes abnormally high, theroregulatory homeostasis is
   maintained by
   a. an increase in sweat gland activity and blood flow to the skin.
   b. a decrease in blood flow to the skin and sweat gland activity.
   c. an increase in blood flow to the skin and a decrease in sweat
      gland activity.
   d. an increase in sweat gland activity and a decrease in blood
      flow to the skin.

4. Excessive perspiration to maintain normal body temperature may cause
   a. excessive secretion of sebum by sebaceous glands.
   b. dangerous fluid and electrolyte losses.
   c. the apocrine glands to discharge a sticky, cloudy, odorous secretion.
   d. All of the above are correct.

5. Perspiration (or sweat) produced by eccrine sweat glands consists of
   a. 50 percent water, 1 percent sebum, 40 percent wastes, and 9 percent
      nutrients.
   b. 90 percent water, 5 percent electrolytes, and 5 percent wastes and
      nutrients.
   c. 1 percent sebum, 9 percent wastes and nutrients, and 90 percent water.
   d. 99 percent water, and 1 percent electrolytes, organic nutrients, and
      wastes.

OBJECTIVE 5 Discuss the effects of ultraviolet radiation on the skin and the role played by
melanocytes.

1. Melanin prevents skin damage due to UV light by
   a. covering and protecting the epidermal layers.
   b. absorbing UV light.
   c. protecting the nuclei of epidermal cells.
   d. b and c are correct.
2. Excessive exposure to UV light may damage
   a. cellular DNA, resulting in mutations.
   b. connective tissue and cause wrinkling.
   c. chromosomes and cause cancer.
   d. all of the above.

3. Excessive exposure to UV light may cause
   a. a decrease in the number of melanocytes.
   b. an increase in the number of melanocytes.
   c. a decrease in vitamin D production.
   d. damage to the DNA in cells in the stratum germinativum.

4. Melanocytes prevent skin damage due to UV light by protecting the DNA
   within the nuclei of epidermal cells.

5. Melanocytes begin producing melanin when they are exposed to UV light.

OBJECTIVE 6 Discuss the functions of the skin's accessory structures:

1. Accessory structures of the skin include
   a. the dermis, epidermis, hypodermis, subcutaneous layer, and hair follicles.
   b. a cutaneous and subcutaneous layer, dermis, epidermis, and hair.
   c. hair, hair follicles, sebaceous glands, sweat glands, and nails.
   d. blood vessels, macrophages, neurons, hair papillae, and the cuticle.

2. Hairs are best described as
   a. living structures that are produced in the dermis and extend into the epidermis.
   b. nonliving epithelial cells that undergo keratinization and die.
   c. living structures containing a cortex and medulla.
   d. nonliving structures produced in organs called hair follicles.

3. The sensitivity mechanism in hair follicles that provides an early warning system that may help prevent injury is the presence of a
   a. cortex and medulla making up the core of the hair.
   b. cuticular surface layer of cells.
   c. sensory nerve fiber associated with the base of each hair follicle.
   d. Hairs are nonliving; there is no sensitivity mechanism.

4. Natural body odor is produced by the ____________ glands.
   a. apocrine
   b. eccrine
   c. sebaceous
   d. sweat

5. During adolescence, the sebaceous glands are especially prone to
   a. producing excessive perspiration while sweating.
   b. developing acne.
   c. causing redness of the skin due to blood vessel dilation.
   d. all the above are correct.
6. Other types of modified sweat glands with specialized secretions are
   a. holocrine glands and sudoriferous glands.
   b. mammary glands and ceruminous glands.
   c. merocrine glands and eccrine glands.
   d. endocrine and exocrine glands.

7. Protection for the tips of the fingers and toes is provided by the ________.

8. Hair develops from a group of epidermal cells at the base of a tube-like depression called
   a(n) ________.

9. The accessory structures that prevent the entry of foreign particles into the eye are the
   ________.

10. The arrector pili are muscles of the integument involved in creating ________.

**Labeling Exercise**

Identify the structures in Figure 5-2 (a) and (b). Place your answers in the spaces provided below the drawings.

**FIGURE 5-2 Nail Structure: (a) Nail Surface (b) Sectional View**

1. free edge
2. hyponychium
3. nail bed
4. lateral nail groove
5. lunula
6. eponychium
7. nail root
8. eponychium
9. lunula
10. nail body
11. hyponychium
12. phalanx (bone)
OBJECTIVE 7  Explain the mechanisms that produce hair and determine hair texture and color.

1. Hair production begins at the
   a. reticular layer of the dermis.
   b. papillary layer of the dermis.
   c. hypodermis.
   d. base of a hair follicle.

2. Except for red hair, the natural factor responsible for various shades of hair color is
   a. the number of melanocytes.
   b. the amount of carotene production.
   c. the type of pigment present.
   d. all of the above.

3. The development of gray hair is due to the
   a. death of hair follicles.
   b. production of air bubbles in the hair.
   c. production of gray pigments.
   d. reduction of melanocyte activity.

4. The various types of hair are due to the
   a. arrector pili.
   b. follicles.
   c. hair papilla.
   d. melanocytes.

5. The shaft of the hair is stiff due to the presence of a protein substance called
   a. elastin.
   b. collagen.
   c. keratin.
   d. vellus.

6. The fine “peach fuzz” hairs formed over much of the body surface are called
   a. vellus.
   b. lunula.
   c. arrector pili.
   d. eccrines.

OBJECTIVE 8  Explain how the skin responds to injury and repairs itself.

1. The immediate response by the skin to an injury is that
   a. bleeding occurs, and mast cells trigger an inflammation response.
   b. the epidermal cells are immediately replaced.
   c. fibroblasts in the dermis create scar tissue.
   d. a scab is formed.
2. The practical limit to the healing process in the skin is the formation of inflexible, fibrous, noncellular
   a. scabs.
   b. skin grafts.
   c. ground substance.
   d. scar tissue.

3. The appearance of blisters and very painful sensations is indicative of
   a. a first-degree burn.
   b. a second-degree burn.
   c. a third-degree burn.
   d. none of the above.

4. The granulation tissue that appears during the healing process is a combination of
   a. a scab, fibrin, and macrophages.
   b. a keloid, a blood clot, and newly arriving phagocytes.
   c. a blood clot, fibroblasts, and an extensive capillary network.
   d. macrophages, fibroblasts, pathogens, and phagocytes.

5. An essential part of the healing process during which the edges of a wound are pulled closer together is called
   a. cyanosing.
   b. regressing.
   c. regeneration.
   d. contraction.

**OBJECTIVE 9** Summarize the effects of the aging process on the skin.

1. Dangerously high body temperatures occur sometimes in the elderly due to
   a. reduction in the number of Langerhans cells.
   b. decreased blood supply to the dermis.
   c. decreased sweat gland activity.
   d. b and c only.

2. A factor that causes increased skin damage and infection in the elderly is
   a. decreased sensitivity of the immune system.
   b. decreased vitamin D production.
   c. a decline in melanocyte activity.
   d. a decline in glandular activity.

3. Hair turns gray or white due to
   a. a decline in glandular activity.
   b. a decrease in the number of Langerhans cells.
   c. decreased melanocyte activity.
   d. decreased blood supply to the dermis.
4. Sagging and wrinkling of the integument results from
   a. a decline of germinativum cell activity in the epidermis.
   b. a decrease in the elastic fiber network of the dermis.
   c. a decrease in vitamin D production.
   d. deactivation of sweat glands.

5. In older Caucasians, the skin becomes very pale because of a decline in melanocyte activity.

6. In older adults, dry and scaly skin is usually a result of a decrease in glandular activity.

**Part II: Chapter Comprehensive Exercises**

**A. Word Elimination**

Circle the term that does not belong in each of the following groupings.

1. protection fat storage excretion secretion cutaneous
2. dermis germinativum spinosum granulosum lucidum
3. touch pain secretion pressure temperature
4. hair follicles melanocyte sebaceous glands sweat glands nails
5. protect cushion stabilize insulate guard
6. sebaceous holocrine acne sebum apocrine
7. apocrine merocrine sebaceous eccrine sweat
8. cuticle arrector pili lunula nail root eponychium
9. increased immunity dry skin gray hair wrinkling weak muscles
10. papillary reticular collagen dermis epidermis

**B. Matching**

Match the terms in Column “B” with the terms in Column “A.” Write letters for answers in the spaces provided.

<table>
<thead>
<tr>
<th>COLUMN A</th>
<th>COLUMN B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. subcutaneous layer</td>
<td>a. decreased oxygen to skin</td>
</tr>
<tr>
<td>2. epidermis</td>
<td>b. life-threatening skin cancer</td>
</tr>
<tr>
<td>3. stratum granulosum</td>
<td>c. contains desmosomes</td>
</tr>
<tr>
<td>4. stratum corneum</td>
<td>d. thickened area of scar tissue</td>
</tr>
<tr>
<td>5. cyanosis</td>
<td>e. hypodermis</td>
</tr>
<tr>
<td>6. melanoma</td>
<td>f. activated arrector pili</td>
</tr>
<tr>
<td>7. papillary layer (dermis)</td>
<td>g. produces keratin</td>
</tr>
<tr>
<td>8. “goose bumps”</td>
<td>h. no blood vessels</td>
</tr>
<tr>
<td>9. eponychium</td>
<td>i. cuticle</td>
</tr>
<tr>
<td>10. keloid</td>
<td>j. contains capillaries and nerves</td>
</tr>
</tbody>
</table>
C. Concept Map

This concept map summarizes and organizes some of the ideas in Chapter 5. Using the following terms, fill in the circled numbered, blank spaces to complete the concept map. Follow the numbers that comply with the organization of the map.

Hair
Dermis

Loose connective tissue
Elastic and collagen fibers

Integument Structure
Major components

Cutaneous membrane (skin)
Consists of

Epidermis
5 Strata
Corneum
 Lucidum
 Granulosum
 Spinosum
 Germinativum

Papillary layer

2 Major components

Dermis

Deep Reticular

2 Types

Apocrine
Merkocrine

Sweat glands

Sebaceous glands (holocrine)

Hair follicles

Nails

Dense, irregular connective tissue

Component of

Subcutaneous layer (hypodermis)

Contains

Elastic/ Collagen Fibers
D. Crossword Puzzle

This crossword puzzle reviews the material in Chapter 5. To complete the puzzle, you must know the answers to the clues given, and you must be able to spell the terms correctly.

ACROSS
1. The stratum ____ is the outermost layer of the epidermis.
4. The stratum ____ is the layer of epidermis where the cells are actively growing.
7. Melanin protects a cell's nuclear ____.
8. This layer of skin contains most of the accessory structures.
9. The ____ pili muscles are responsible for goose bumps.
11. Freckles are spot concentrations of ____.
13. The stratum corneum layer is a part of this layer of skin.
14. A blocked sebaceous gland can result in this skin condition.
15. The integumentary system includes the skin, hair, nails, and ____.

DOWN
2. Skin is the largest ____ of the body.
3. Albinos have the same number of ____ as non-albinos.
5. A term that refers to skin and its accessory structures.
6. The skin becomes pale if ____ is(are) underactive.
10. This gland helps maintain proper body temperature.
12. This gland produces "natural body odor."
E. Short-Answer Questions

Briefly answer the following questions in the spaces provided.

1. A friend says to you, “Don’t worry about what you say to her; she is thick skinned.” Anatomically speaking, what areas of the body would your friend be referring to? Why are these areas thicker?

2. Two women are discussing their dates. One of them says, “I liked everything about him except he had body odor.” What is the cause of body odor?

3. A hypodermic needle is used to introduce drugs into the loose connective tissue of the hypodermis. Beginning on the surface of the skin in the region of the thigh, list, in order, the layers of tissue the needle would penetrate to reach the hypodermis.

4. The general public associates a tan with good health. What is wrong with this assessment?

5. Many shampoo advertisements suggest that some ingredients, such as honey, kelp extracts, beer, vitamins, and other nutrients, are beneficial to the hair. Why could this be considered false advertising?

6. Two teenagers are discussing their problems with acne. One says to the other, “Sure wish I could get rid of these whiteheads.” The other replies, “At least you don’t have blackheads like I do.” What is the difference between a “whitehead” and a “blackhead”?