

## Chapter 4 The Integumentary System

### OVERVIEW

The purpose of this chapter is to teach the anatomy and physiology of the integumentary system and to present select concepts associated with pathophysiology or disease issues of the integumentary system. Anatomy is covered before physiology, and the functions of the system are later explained showing the interrelationship of anatomy and physiology in the context of two people on a run.

This chapter includes a summary/review group activity listed under Outcome 4.13. This student-centered activity works well for any chapter. Students usually find it challenging, nonthreatening, slightly competitive, and fun. It works as a good student-driven chapter review and informal assessment for the instructor.

Chapter figures can be found in the Online Learning Center (OLC). Discussion points, group activities, and quizzes listed in the summary table below are explained under their individual outcomes following the table. Answer keys to the text chapter review questions, workbook concept maps, and workbook review questions are located at the end of the chapter.

A review guide is also available on the OLC. This guide lists all of the learning outcomes for the chapter and gives space for students to take notes and make sketches. This can be an important tool to encourage students to pay attention to what they are learning and to use to either take initial notes or to organize their existing notes before exams.

Near the end of the chapter you will find topics relating to diseases or disorders of the integumentary system. The select diseases or disorders range from a discussion on skin cancer to skin infections, such as warts, acne, psoriasis and impetigo, etc.

### COMPETENCY CORRELATION GRID

Learning Outcome	CAAHEP Competencies	ABHES Competencies
4.1 Use medical terminology related to the integumentary system	I.C.1. Describe structural organization of the human body	3.a. Define and use entire basic structure of medical words and be able to accurately identify in the correct context, i.e., root, prefix, suffix, combinations, spelling and definitions

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4.2 Describe the histology of the epidermis, dermis, and hypodermis.	I.C.1. Describe structural organization of the human body	2.b. Identify and apply the knowledge of all body systems, their structure and functions, and their common diseases, symptoms and etiologies.
4.3 Describe the cells of the epidermis and their function.	I.C.5. Describe the normal function of each body system	2.b. Identify and apply the knowledge of all body systems, their structure and functions, and their common diseases, symptoms and etiologies.
4.4 Describe the structures of the dermis and their functions.	I.C.5. Describe the normal function of each body system	2.b. Identify and apply the knowledge of all body systems, their structure and functions, and their common diseases, symptoms and etiologies.
4.5 Compare and contrast the glands of the skin in terms of their structure, products, and functions.	I.C.5. Describe the normal function of each body system	2.b. Identify and apply the knowledge of all body systems, their structure and functions, and their common diseases, symptoms and etiologies.
4.6 Describe the histology of a hair and hair follicle.	I.C.1. Describe structural organization of the human body	2.b. Identify and apply the knowledge of all body systems, their structure and functions, and their common diseases, symptoms and etiologies.
4.7 Explain how a hair grows and is lost.	I.C.5. Describe the normal function of each body system	2.b. Identify and apply the knowledge of all body systems, their structure and functions, and their common diseases, symptoms and etiologies.
4.8 Describe the structure and function of a nail.	I.C.5. Describe the normal function of each body system	2.b. Identify and apply the knowledge of all body systems, their structure and functions, and their common diseases, symptoms and etiologies.
4.9 Explain how the layers and structures of the skin work together to carry out the functions of the system.	I.C.5. Describe the normal function of each body system	2.b. Identify and apply the knowledge of all body systems, their structure and functions, and their common diseases, symptoms and etiologies.
4.10 Explain how the skin responds to injury and repairs itself.	I.C.5. Describe the normal function of each body system	2.b. Identify and apply the knowledge of all body systems, their structure and functions, and their common diseases, symptoms and etiologies.
4.11 Compare and contrast three degrees of burns in terms of symptoms, layers of the skin affected, and method used by the body for healing.	I.C.6. Identify common pathology related to each body system	2.b. Identify and apply the knowledge of all body systems, their structure and functions, and their common diseases, symptoms and etiologies.
4.12 Describe the extent of a burn using the rule of nines.	I.C.6. Identify common pathology related to each body system	2.b. Identify and apply the knowledge of all body systems, their structure and functions, and their common diseases, symptoms and etiologies.
4.13 Summarize the effects of aging on the integumentary system.	I.C.10. Compare body structure and function of the human body across the life span	2.b. Identify and apply the knowledge of all body systems, their structure and functions, and their common diseases, symptoms and etiologies.

4.14 Describe a diagnostic test commonly used when diagnosing integumentary system disorders.	I.C.13 Identify integumentary diagnostic tests	2.b. Identify and apply the knowledge of all body systems, their structure and functions, and their common diseases, symptoms and etiologies.
4.15 Describe three forms of skin cancer in terms of the body area most affected, appearance, and ability to metastasize.	I.C.6. Identify common pathology related to each body system	2.b. Identify and apply the knowledge of all body systems, their structure and functions, and their common diseases, symptoms and etiologies.
4.16 Describe a common integumentary disorder other than skin cancer and relate abnormal function to the pathology.	I.C.7. Analyze pathology as it relates to the interaction of body systems	2.b. Identify and apply the knowledge of all body systems, their structure and functions, and their common diseases, symptoms and etiologies.

SUMMARY TABLE 4

LEARNING OUTCOME	LECTURE OUTLINE	ACTIVITIES – TALKING POINTS	ASSESSMENTS
4.1 Use medical terminology related to the integumentary system.	I. Overview Word roots and combining forms Pronunciation key	<b>Talking Point:</b> Stress that there is a difference between the integumentary system and “skin.”	<b>WkBk Chapter Review Questions:</b> <ul style="list-style-type: none"> <li>Word deconstruction: 1-5</li> </ul>
4.2 Describe the histology of the epidermis, dermis, and hypodermis.	II. Anatomy of the skin, hair, and nails  <b>Chapter Figures:</b> 4.2, 4.3, 4.4	<b>WkBk Coloring Book:</b> <ul style="list-style-type: none"> <li>Skin</li> </ul> Figure 4.1 <b>WkBk Concept maps:</b> <ul style="list-style-type: none"> <li>Layers of the skin</li> </ul> Figure 4.7  <b>Talking Point:</b> It is important to stress the difference in the anatomy of thick and thin skin. The presence of stratum basale in the hair follicles in thin skin is relevant to the healing of skin injuries discussed later in	<b>Spot Check:</b> 1 <b>WkBk Chapter Review Questions:</b> <ul style="list-style-type: none"> <li>MS: 2</li> </ul>

		the chapter.	
4.3 Describe the cells of the epidermis and their function.	<p>A. Epidermis</p> <ol style="list-style-type: none"> <li>1. Cells of the epidermis               <ol style="list-style-type: none"> <li>a. Keratinocytes</li> <li>b. Melanocytes</li> <li>c. Tactile cells</li> <li>d. Dendritic cells</li> </ol> </li> </ol> <p><b>Chapter Figures:</b> 4.4, 4.5, 4.6</p>	<p><b>WkBk Concept maps:</b></p> <ul style="list-style-type: none"> <li>• Layers of the skin</li> </ul> <p>Figure 4.7</p>	<p><b>WkBk Chapter Review Questions:</b></p> <ul style="list-style-type: none"> <li>• MS: 3</li> <li>• Critical thinking: 2</li> </ul>
4.4 Describe the structures of the dermis and their functions.	<p>B. Dermis</p> <ol style="list-style-type: none"> <li>1. Papillae</li> <li>2. Fibers</li> <li>3. Nerve endings</li> </ol> <p><b>Chapter Figure:</b> 4.7</p>	<p><b>WkBk Coloring Book:</b></p> <ul style="list-style-type: none"> <li>• Skin</li> </ul> <p>Figure 4.1</p> <p><b>WkBk Lab Exercises and Activities:</b></p> <ul style="list-style-type: none"> <li>• Skin observations 1,2,3</li> </ul> <p>Figures: 4.4, 4.5, 4.6</p> <p><b>WkBk Concept maps:</b></p> <ul style="list-style-type: none"> <li>• Layers of the skin</li> </ul> <p>Figure 4.7</p> <p><b>Talking Point:</b> Be sure to discuss fingerprints and their relationship to papillae.</p>	<p><b>Spot Check:</b> 2</p> <p><b>WkBk Chapter Review Questions:</b></p> <ul style="list-style-type: none"> <li>• MS: 3</li> </ul>
4.5 Compare and contrast the glands of the skin in terms of their	<ol style="list-style-type: none"> <li>4. Cutaneous glands               <ol style="list-style-type: none"> <li>a. Sebaceous glands</li> </ol> </li> </ol>	<p><b>WkBk Concept Maps:</b></p> <ul style="list-style-type: none"> <li>• Cutaneous glands</li> </ul>	<p><b>WkBk Chapter Review Questions:</b></p> <ul style="list-style-type: none"> <li>• Matching: 1-5</li> </ul>

structure, products, and functions.	b. Sweat glands Table 4.1  <b>Chapter Figure:</b> 4.7, 4.8	Figure 4.8  <b>Talking point:</b> Be sure to discuss the difference between the two main types of sweat glands (apocrine and merocrine).	
4.6 Describe the histology of a hair and hair follicle.	5. Hair follicles C. Hair 1. Lugo hair 2. Vellus hair 3. Termial hair  <b>Chapter Figure:</b> 4.9, 4.10	<b>WkBk Coloring Book:</b> <ul style="list-style-type: none"> <li>• Hair and Hair follicle</li> </ul> Figure 4.2  <b>Talking point:</b> Be sure to discuss why hair turns gray or white as we age.	<b>WkBk Chapter review questions:</b> <ul style="list-style-type: none"> <li>• Matching: 6-10</li> </ul>
4.7 Explain how a hair grows and is lost.			<b>Spot Check:</b> 3 <b>WkBk Chapter Review Questions:</b> <ul style="list-style-type: none"> <li>• MS: 4</li> </ul>
4.8 Describe the structure and function of a nail.	D. Nails  <b>Chapter Figure:</b> 4.11	<b>WkBk Coloring Book:</b> <ul style="list-style-type: none"> <li>• Nails</li> </ul> Figure 4.3 <b>Talking point:</b> Perhaps discuss that the lunula of the nail is used as a diagnostic concept in the hospital to help determine if a patient (who can't respond) is too cold or too hot.	<b>WkBk Chapter Review Questions:</b> <ul style="list-style-type: none"> <li>• MS: 5</li> </ul>

4.9 Explain how the layers and structures of the skin work together to carry out the functions of the system.	<p>III. Physiology of the integumentary system</p> <p>A. Functions of Skin</p> <ol style="list-style-type: none"> <li>1. Protection</li> <li>2. Vitamin D production</li> <li>3. Temperature regulation</li> <li>4. Sensation</li> <li>5. Nonverbal communication</li> <li>6. Water retention</li> </ol> <p><b>Chapter Figure:</b> 4.12</p>	<p><b>WkBk Lab Exercises and Activities:</b></p> <ul style="list-style-type: none"> <li>• Skin observation 3</li> </ul> <p>Figure 4.6</p> <p><b>Talking Point:</b> Have the students draw four dots on the back of their hands to stress the complexity of the anatomy of the system. The number of structures in the square inch are listed in LO 4.9 in the text.</p>	<p><b>Spot Check:</b> 4</p> <p><b>WkBk Chapter Review Questions:</b></p> <ul style="list-style-type: none"> <li>• MS: 6</li> </ul>
4.10 Explain how the skin responds to injury and repairs itself.	<p>IV. Injuries to the skin</p> <p>A. Regeneration vs. fibrosis</p> <p><b>Chapter Figure:</b> 4.13</p>	<p><b>Talking point:</b> Discuss why some cuts will repair and the skin looks normal while others will repair and form scar tissue.</p>	<p><b>Spot Check:</b> 5</p> <p><b>WkBk Chapter Review Questions:</b></p> <ul style="list-style-type: none"> <li>• MS: 9</li> <li>• Critical thinking: 1</li> </ul>
4.11 Compare and contrast three degrees of burns in terms of symptoms, layers of the skin affected, and method used by the body for healing.	<p>B. Burns</p> <ol style="list-style-type: none"> <li>1. First-degree burns</li> <li>2. Second-degree burns</li> <li>3. Third-degree burns</li> </ol> <p><b>Chapter Figure:</b> 4.14</p>	<p><b>WkBk Concept Maps:</b></p> <ul style="list-style-type: none"> <li>• Burns</li> </ul> <p>Figure 4.9</p>	<p><b>Spot Check:</b> 6</p> <p><b>WkBk Chapter Review Questions:</b></p> <ul style="list-style-type: none"> <li>• MS: 10</li> <li>• Critical thinking: 1</li> </ul>
4.12 Describe the extent of a burn using the rule of nines.	<p><b>Chapter Figure:</b> 4.15</p>	<p><b>Talking point:</b> Perhaps give scenarios of a pretend burned victim and have students</p>	<p><b>Spot Check:</b> 6</p> <ul style="list-style-type: none"> <li>•</li> </ul>

		determine the % of burned tissue. Such as; this patient has been burned over 20% of his body.	
4.13 Summarize the effects of aging on the integumentary system.	V. Effects of aging on the integumentary system	<b>Talking point:</b> Due to aging, the skin becomes thinner and therefore it is more difficult to retain heat. This explains why our grandparents sit on the front porch when the temperature is 85 degrees and they are wearing sweaters.	<b>Spot Check:</b> 7 <b>WkBk Chapter Review Questions:</b> <ul style="list-style-type: none"><li>MS: 7</li></ul>
4.14 Describe a diagnostic test commonly used when diagnosing integumentary system disorders.	Table 4.2		<b>WkBk completion:</b> <ul style="list-style-type: none"><li>1-3</li></ul>
4.15 Describe three forms of skin cancer in terms of the body area most affected, appearance, and ability to metastasize.	VI. Diagnostic Tests for Integumentary System Disorders  A. Integumentary System Disorders 1. Skin cancer 2. Basal cell carcinoma 3. Squamous cell carcinoma  <b>Chapter Figure:</b> 4.16	<b>WkBk Lab Exercises and Activities:</b> <ul style="list-style-type: none"><li>Skin observation 1</li></ul> Figure 4.4 <b>WkBk Concept Maps:</b> <ul style="list-style-type: none"><li>Skin cancer</li></ul> Figure 4.10  <b>Talking point:</b> Be sure to mention why we take a close look at skin tissue if a change occurs – such as: lump formation, color change of a mole, shape change of a mole, etc.	<b>WkBk Chapter Review Questions:</b> <ul style="list-style-type: none"><li>MS: 8</li></ul>
4.16 Describe a common	B. Skin infections	<b>Chapter Summary Group Activity:</b> 1	<b>WkBk Chapter Review Questions:</b>

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<p>integumentary disorder other than skin cancer and relate abnormal function to the pathology.</p>	<ol style="list-style-type: none"> <li>1. Impetigo</li> <li>2. Cellulitis</li> <li>3. Warts</li> <li>4. Herpes simplex virus (HSV)</li> <li>5. Herpes varicella-zoster</li> <li>6. Shingles</li> <li>7. Fungal skin infections</li> <li>8. Parasitic skin infections</li> </ol> <p><b>Chapter Figures:</b> 4.17, 4.18, 4.19, 4.20, 4.21, 4.22, 4.23, 4.24, 4.25</p> <p><b>B. Other Common Skin Disorders</b></p> <ol style="list-style-type: none"> <li>1. Psoriasis</li> <li>2. Dermatitis <ol style="list-style-type: none"> <li>a. Contact dermatitis</li> <li>b. Atopic dermatitis</li> </ol> </li> <li>3. Decubitus ulcers</li> <li>4. Hives</li> <li>5. Scleroderma</li> </ol>		<ul style="list-style-type: none"> <li>• MS: 1</li> </ul> <p><i>Case Study</i></p> <ul style="list-style-type: none"> <li>• 1-5</li> </ul>
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**INDIVIDUAL OUTCOMES:**

**OUTCOME 4.2**

**Spot Check 1:** How does the anatomy of the epidermis of your forearm compare to the anatomy of the epidermis of your lips?

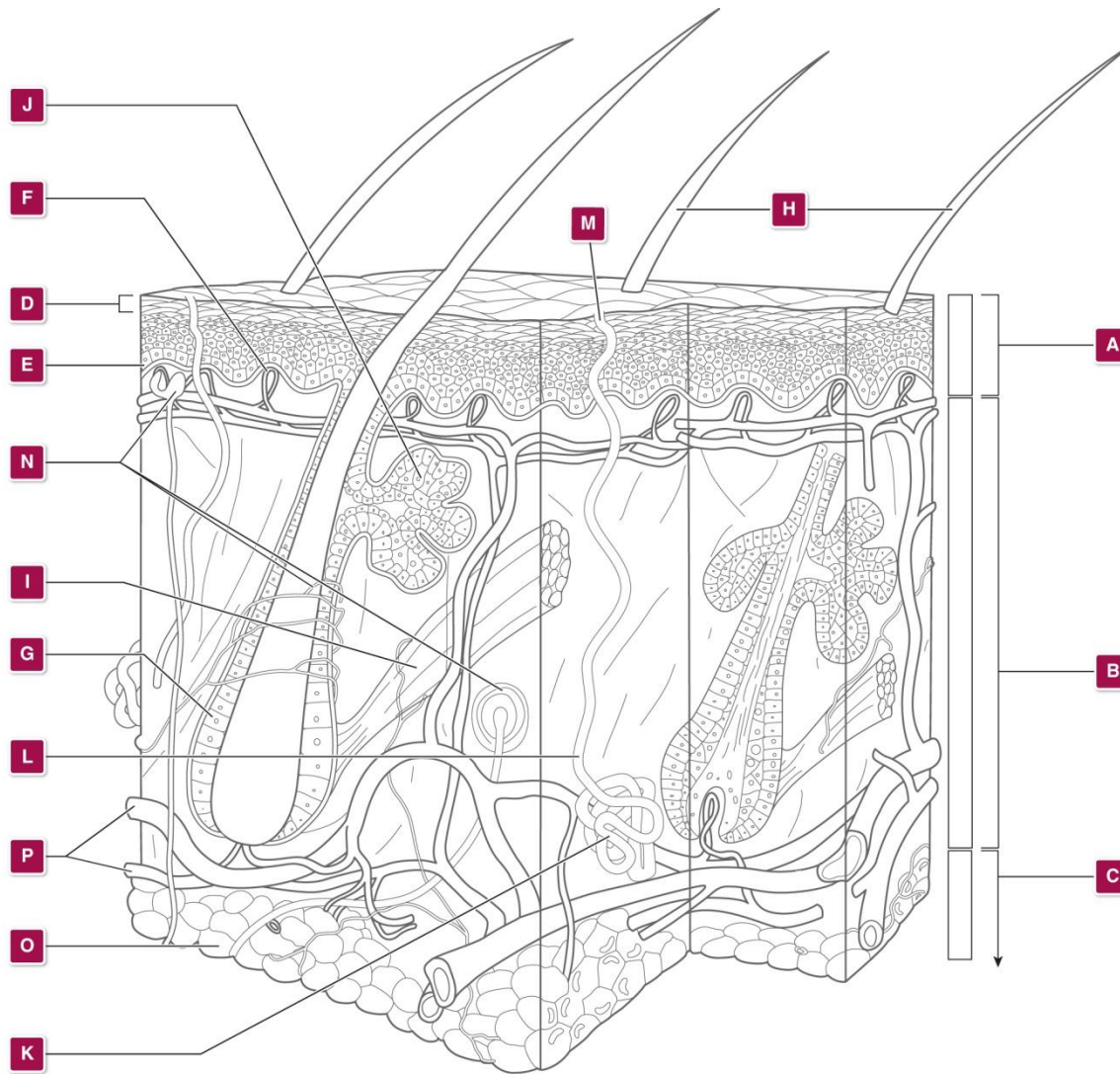
*Answer: The forearm has thin skin, therefore its epidermis does not have a stratum lucidum. The lips have thick skin, therefore their epidermis does have a stratum lucidum.*

**OUTCOME 4.4**

**Spot Check 2:** How deep into layers of the skin would a cut have to be in order to cause bleeding?

*Answer: A cut would need to extend into the dermis to bleed.*

**OUTCOME 4.5**



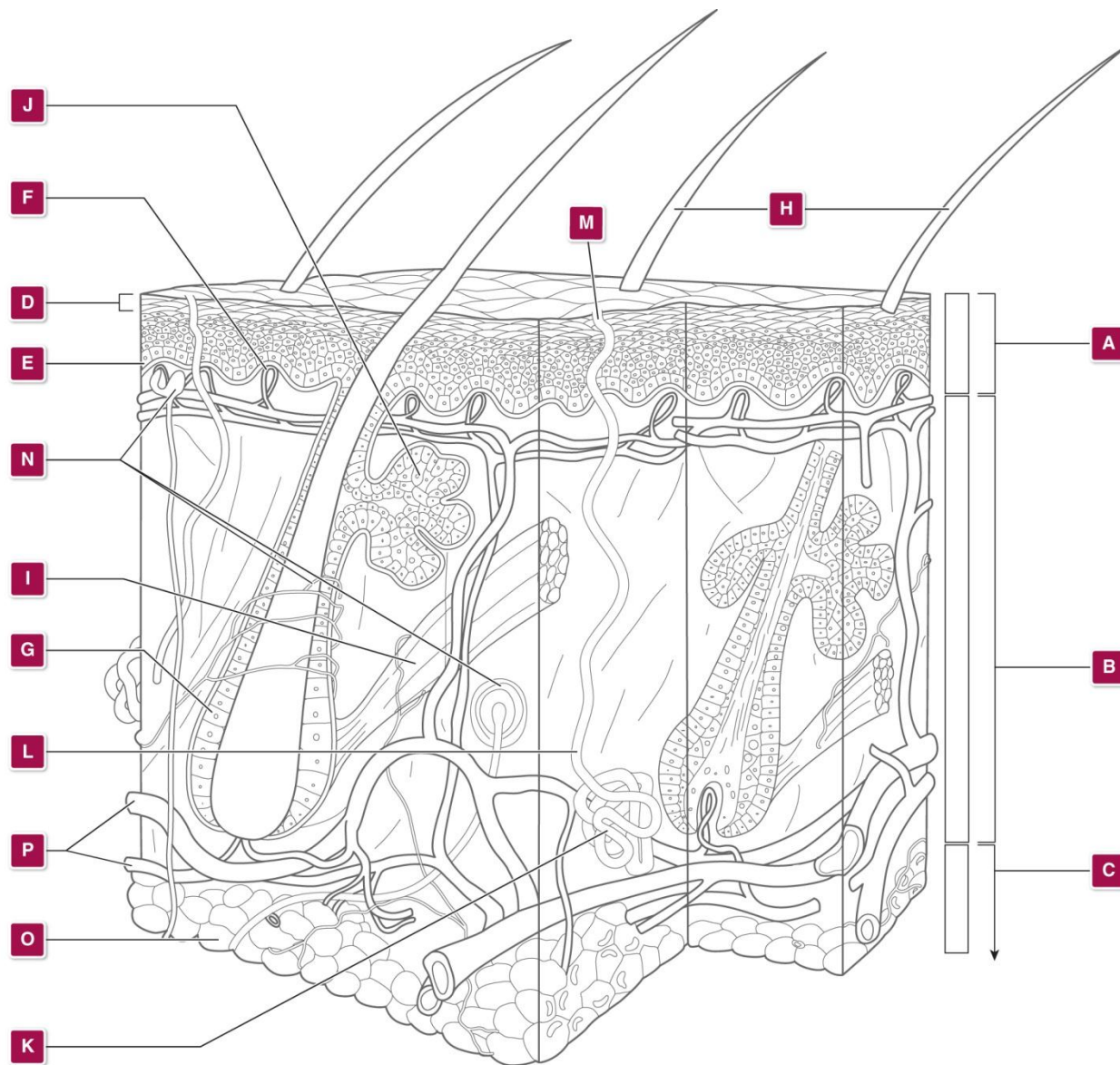
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1. Identify layer "A".                      *Epidermis*
2. Identify layer "B".                      *Dermis*
3. Identify layer "C".                      *Hypodermis*
4. Of what type of tissue is layer "A" composed?                      *Stratified squamous epithelial tissue*
5. Of what type of tissue is layer "C" composed?                      *Adipose connective tissue*
6. Identify the stratum labeled "E".                      *Stratum basale*
7. Identify the stratum labeled "D".                      *Stratum corneum*
8. What type of cell(s) is (are) common to both "E" and "D"?                      *Keratinocytes*
9. What type of cell is represented by "N"?                      *Nerve cell*
10. What is (are) the function(s) of the fibers shown in layer "B"?                      *Elastin fibers provide elasticity, collagen fibers provide strength*

#### OUTCOME 4.7

**Spot Check 3:** Describe what eyelashes would look like if they had the same growth cycle as scalp hair.

*Answer: The eyelashes would be extremely long. Growing a 1/2 inch per month for 3 years would cause eyelashes to be 18 inches in length!*



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1. Stratum "E" dips down to form structure "G". Identify "G". *Hair follicle*
2. What type of cells can be found in "G"? *Keratinocytes and melanocytes*
3. Identify structure "I". *Arector pili muscle*
4. Identify structure "J". *Sebaceous gland*
5. What does structure "J" produce? *Sebum*
6. What part of a hair is represented by "H"? *Shaft*
7. Identify structure "K". *Sweat gland*
8. If this sample of skin was taken from the arm of an adult, describe the substance produced by "K". *Merocrine sweat that contains mostly water and some lactic acid, salt, and urea.*
9. What is the primary protein found in a hair? *Keratin*
10. Is this an image of thick skin or thin skin? Explain. *Thin skin, because of the presence of hair*

### OUTCOME 4.9

**Spot Check 4:** How might the histology of the dermis hamper the movement of bacteria as they go deeper into the skin?

*Answer: The increasing fibers hamper the movement of bacteria.*

### Discussion: 1

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Is there a difference between dark skin and light skin in their ability to carry out the functions of this system? What anatomy would account for any differences? Does geography make a difference? *The anatomy is the same in dark and light skin. However, the difference in the amount of melanin production by melanocytes does make a difference. Increased melanin production does affect the amount of vitamin D production. UV light is needed to start vitamin D production, and melanin protects the skin from UV light. Northern climates will add to this difference because more skin will be covered to keep warm.*

### OUTCOME 4.10

**Spot Check 5:** How would the anatomy and physiology of scar tissue formed during fibrosis differ from the anatomy and physiology of normal epidermis formed through regeneration?

*Answer: There would be no keratinocytes to generate new waterproofed epidermal cells and no melanocytes to provide melanin for protection from UV light.*

### OUTCOME 4.12

**Spot Check 6:** Hailey went snow skiing in February on a bright, sunny day. It was cold and she was adequately dressed. She got a sunburn on her face, which was exposed. She did not have any blisters. Classify the severity and extent of her burn.

*Answer: Hailey has a first degree burn over approximately 4.5 % of her body.*

### OUTCOME 4.13

**Spot Check 7:** What could be done to minimize specific effects of aging on the skin, hair, or nails?

*Answer: Discussion question; answers may vary.*

**Chapter Summary Group Activity:**

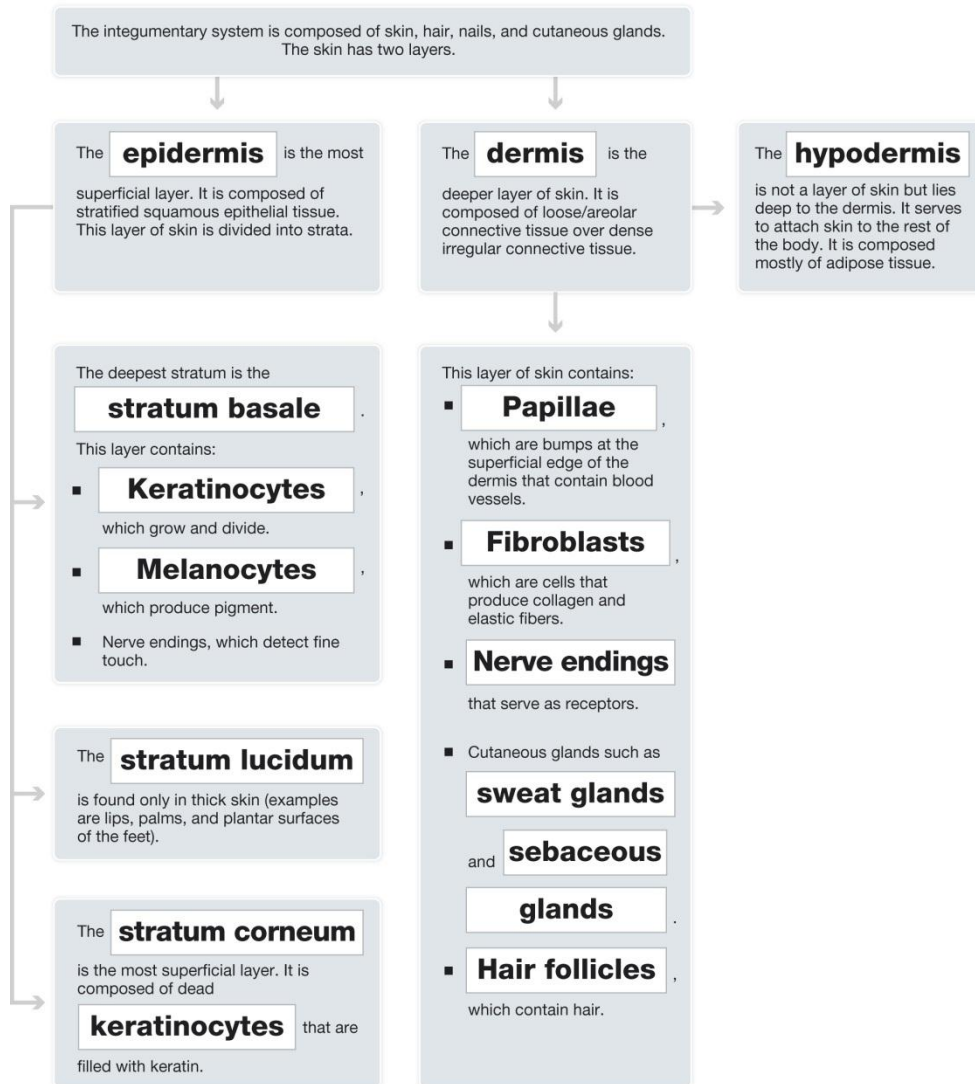
Divide the class into 6 groups, numbering the groups 1-6. Use 4 to 5 large pieces of paper hung on the front wall of the room, or a large white board. Write the numbers 1-6 down the left side of each piece of paper, or in 4 to 5 columns spread out on the white board. Give each group a marker. Tell each group that they are responsible for together coming up with a clear, true statement about the integumentary system and writing it next to their group number in column 1. The statement from each group must be unique and no statements may be repeated. Each column must be completed by all groups before a group may enter a new statement in the next column. The instructor should make sure each column is complete before any group moves to the next column and that there are no repeats. Once the columns are filled, the instructor should ask the class if any statements are incorrect. This activity works as a nice review because all of the students have to work together in their groups to monitor what has already been written and to come up with something new before another group writes it in a column. This activity also lets the instructor find misconceptions as a review process before a formal assessment is administered.

**ANSWER KEYS**

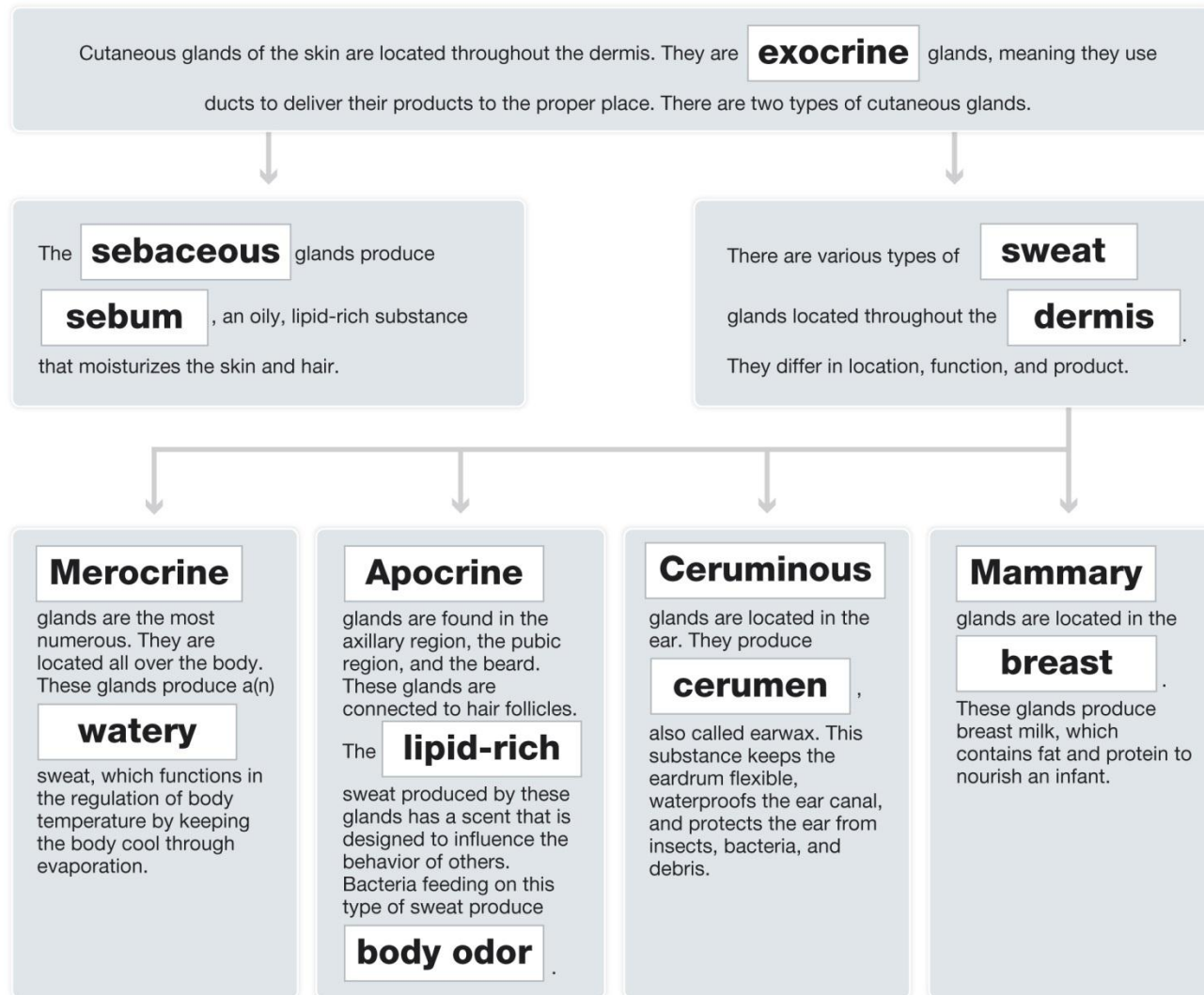
**Chapter Review Questions**

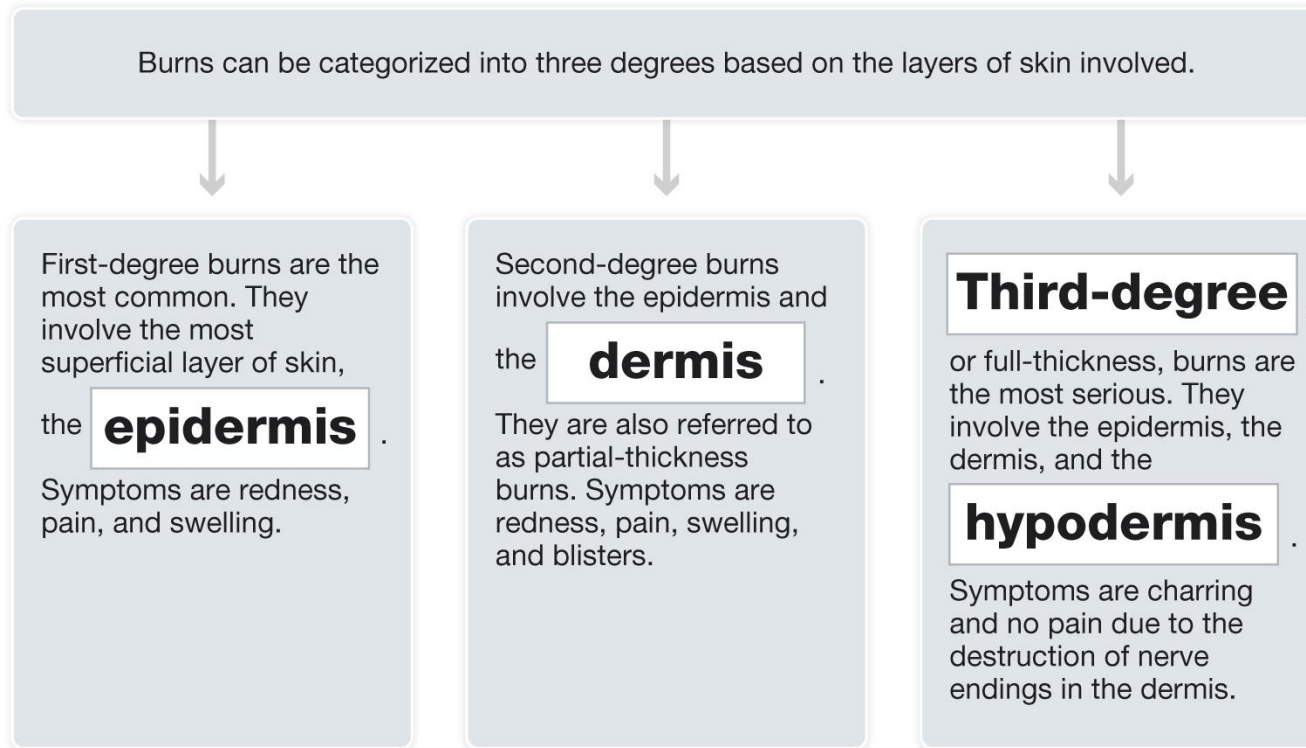
1. A
2. D
3. A
4. D
5. C
6. B
7. B
8. A
9. B
10. D
11. B
12. B
13. C
14. B
15. B
16. C

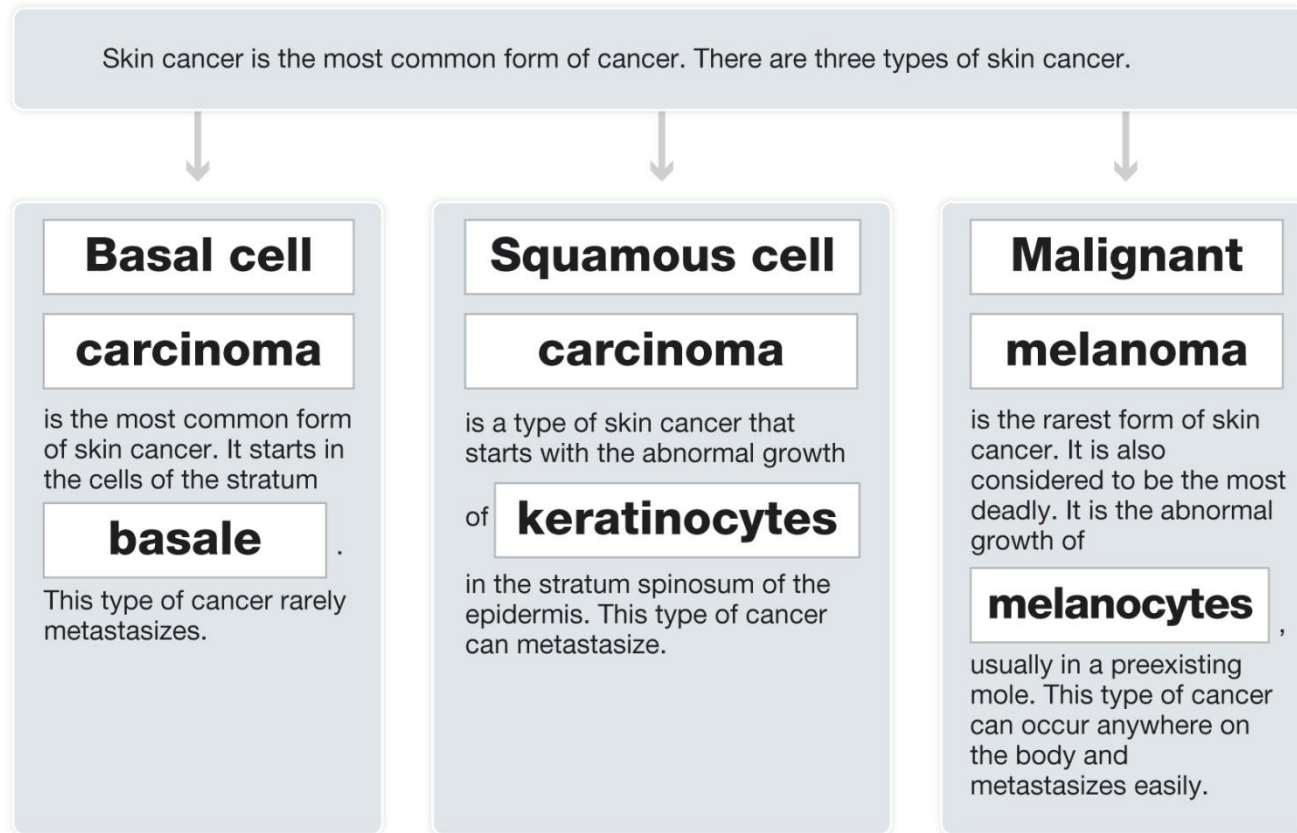


**WORKBOOK CONCEPT MAPS:****Layers of the skin**

## Cutaneous glands







**WORKBOOK CHAPTER REVIEW QUESTIONS:**

**Word deconstruction:** In the text book, you built words to fit a definition using the combining forms and prefixes and suffixes. Here you are to break down the term into its parts (prefixes, roots, and suffixes) and give a definition. Prefixes and suffixes can be found in the back cover of the textbook.

For example: Dermatitis: dermat/ itis --inflammation of the skin

1. Onychoma: onych/ oma, a tumor of the nail
2. Cyanotic: cyano/ tic, pertaining to a bluish color
3. Seborrhea: sebo/ rrhea, flow of sebum (excessive flow of sebum)
4. Keratosis kerat/osis, condition of keratin
5. Subcutaneous: sub/ cutaneous, beneath the skin

**Multiple select:** Select the correct choices for each statement. The choices may be all correct, all incorrect, or any combination of correct and incorrect.

1. Which of the following statements correctly match(es) the infection with the pathogen causing it?

- A. Jock itch is caused by bacteria.
- B. Tinea infections are caused by a virus.
- C. Cellulitis is most often caused by a virus.
- D. Ringworm is caused by a fungus.**
- E. Warts are caused by a virus.**

2. Which of the following statements correctly match(es) the layer of the skin to the tissue composing it?

- A. The stratum corneum is composed of simple cuboidal epithelial tissue.

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B. The dermis is composed of dense regular connective tissue over dense irregular connective tissue.

C. The dermis is composed of loose/areolar connective tissue over dense regular connective tissue.

***D. The epidermis is composed of stratified squamous epithelial tissue.***

***E. The hypodermis is composed of adipose connective tissue.***

3. Which of the following statements correctly state(s) the location or function of the cells in the epidermis and dermis?

***A. Keratinocytes are located in the stratum basale in the epidermis and the hair follicle of the dermis.***

***B. Melanocytes are located in the stratum basale in the epidermis and the hair follicle of the dermis.***

C. Dendritic cells are located in the stratum basale in the epidermis and the hair follicle of the dermis.

D. Fibroblasts are located in the stratum basale in the epidermis and the hair follicle of the dermis.

E. Dead squamous cells filled with keratin are located in the stratum basale in the epidermis and the hair follicle of the dermis.

4. Which of the following statements is (are) true about hair?

A. Vellus hair starts to develop during the last trimester of fetal development.

***B. Terminal hair is visible on the hair of a newborn's eye brows and eyelashes.***

C. Hair grows at the rate of approximately 1 inch per month.

***D. The growth stage for terminal hair varies by location.***

E. Lanugo hair can be found in the axillary region of an adult.

5. Which of the following statements is (are) true concerning the anatomy of a nail?

A. The lunule is visible at the distal end of all nails.

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- B. The nail plate is made of soft keratin.
- C. The nail plate is made of lipids.
- D. The cuticle of a nail has interlocking plates.
- E. The eponychium is composed of stratum basale cells.

6. Which of the following statements describe(s) a function of the integumentary system?

- A. The skin prevents loss of body fluids.*
- B. Sweat and sebaceous glands are important in temperature regulation.
- C. The skin contains a precursor molecule for vitamins A and C.
- D. The skin contains keratin that protects underlying structures from UV light.
- E. The immune system is alerted to pathogens entering through the skin by dendritic cells.*

7. Which of the following statements is (are) true about aging?

- A. Sagging and wrinkling results because skin becomes more elastic with age.
- B. The number of melanocytes decreases, but the production of some melanocytes increases with age.*
- C. Fibroblasts produce less collagen fibers with age.*
- D. Sebaceous glands produce less sebum with age, causing the hair and skin to be drier.*
- E. The hypodermis thins with age.*

8. Which of the following statements is (are) true concerning skin cancer?

- A. People with dark skin are more likely to develop malignant melanoma.

*B. People with light skin are most likely to develop skin cancer.*

*C. Melanin protects the underlying tissues from UV light.*

D. Sunburns as a child have nothing to do with developing skin cancer later in life.

E. All moles need to be removed.

9. Which of the following statements is (are) true concerning the skin's response to injuries?

A. Normal function returns when the wound is healed by fibrosis.

B. Regeneration results in scar tissue.

*C. The type of healing depends upon how far the edges are apart.*

D. It is important to bring the wound edges together so that the stratum corneum can regenerate new epidermis.

*E. Stratum basale cells reach contact inhibition if the wound heals by regeneration.*

10. Which of the following statements is (are) true about burns?

*A. Second-degree burns produce blisters.*

*B. The most common first-degree burn is a sunburn.*

*C. First-degree burns damage just the epidermis.*

*D. Third-degree burns are the most serious.*

*E. The serious concerns in third-degree burns are infection and fluid loss.*



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**Matching:** Match the following cutaneous glands to the description of what they produce.

- |  |                      |
|--|----------------------|
| <u>  C  </u> 1. Lipid-rich sweat that is used for a scent.               | A. Mammary glands    |
| <u>  B  </u> 2. Waxy substance.  | B. Ceruminous glands |
| <u>  E  </u> 3. Watery sweat used for cooling.                           | C. Apocrine glands   |
| <u>  A  </u> 4. Modified sweat with proteins, lipids, and carbohydrates. | D. Sebaceous glands  |
| <u>  D  </u> 5. Lipid-rich substance that moisturizes hair and skin.     | E. Merocrine glands  |

**Matching:** Match the following structures to their descriptions.

- |   |                  |
|---|------------------|
| <u>  A  </u> 6. Smooth muscle attached to a hair follicle               | A. Arrector pili |
| <u>  G  </u> 7. Opening of a duct for a sweat gland at the skin surface | B. Cuticle       |
| <u>  F  </u> 8. Part of a hair out of the skin.                         | C. Cortex        |
| <u>  D  </u> 9. Soft keratin layer inside the hair                      | D. Medulla       |
| <u>  B  </u> 10. Interlocking plates on a hair surface                  | E. Root          |
|   | F. Shaft         |
|   | G. Pore          |

**Completion:** Fill in the blanks to complete the following statements concerning inflammation.

1. skin scraping can be used to diagnose fungal infections and parasitic infection.
2. Examining the skin using a Wood's Light helps locate pigment changes in the skin
3. A(n) biopsy is a diagnostic test usually performed when skin cancer is suspected.
4. The extent of a burn can be determined by the rule of nines.
5. When determining the extent of a burn, the body is divided into 11 areas, each of which represents approximately 9 percent of the body's surface.

**Critical Thinking:**

1. Consider two second-degree burns of the same severity. One is on the posterior surface of the hand. The other is on the palmar surface of the hand. Given that both wounds are treated the same, which burn should heal faster? Justify your answer in terms of anatomy and physiology.

The burn on the posterior surface of the hand should heal faster. Although the burn extends into the dermis, hair follicles of the dermis supply additional stratum basale so that the stratum basale can reach contact inhibition faster on the posterior surface than the palm. That is because the palmar surface is composed of thick skin with no hair or hair follicles.

2. You are doing some filing and receive a paper cut that does not bleed, but does hurt. Explain how the cut will heal on the basis of the layer of skin that must be involved.

Since the paper cut resulted in bleeding, it must have extended into the dermis because there are no blood vessels in the epidermis. It is a paper cut that would imply a very narrow wound. Therefore the edges of the wound are very close together, so the wound should heal by regeneration with the stratum basale producing new epidermis.

**Case Study:**

1. Shingles, herpes varicella-zoster virus
2. Her condition and symptoms can be treated but her body will always carry the virus that causes the disease.
3. Pain medications and antiviral medications can be used to treat the symptoms and speed up the recovery process.
4. The vesicles follow a linear path along an area of the skin supplied by a spinal nerve.
5. Knowing the patient had chicken pox as a child along with the symptoms present can help clinicians determine a diagnosis of Shingles.