



SKIN AND BODY MEMBRANES

Body membranes, which cover body surfaces, line its cavities, and form protective sheets around organs, fall into two major categories. These are epithelial membranes (skin epidermis, mucosae, and serosae) and the connective tissue synovial membranes.

Topics for review in this chapter include a comparison of structure and function of various membranes, anatomical characteristics of the skin (composed of the connective tissue dermis and the epidermis) and its derivatives, and the manner in which the skin responds to both internal and external stimuli to protect the body.

CLASSIFICATION OF BODY MEMBRANES

1. Complete the following table relating to body membranes. Enter your responses in the areas left blank.

Membrane	Tissue type (epithelial/connective)	Common locations	Functions
Mucous			
Serous			
Cutaneous			
Synovial			

2. Four simplified diagrams are shown in Figure 4-1. Select different colors for the membranes listed below, and use them to color the coding circles and the corresponding structures.

- Cutaneous membrane
- Parietal pleura (serosa)
- Synovial membrane
- Mucosae
- Visceral pericardium (serosa)
- Visceral pleura (serosa)
- Parietal pericardium (serosa)

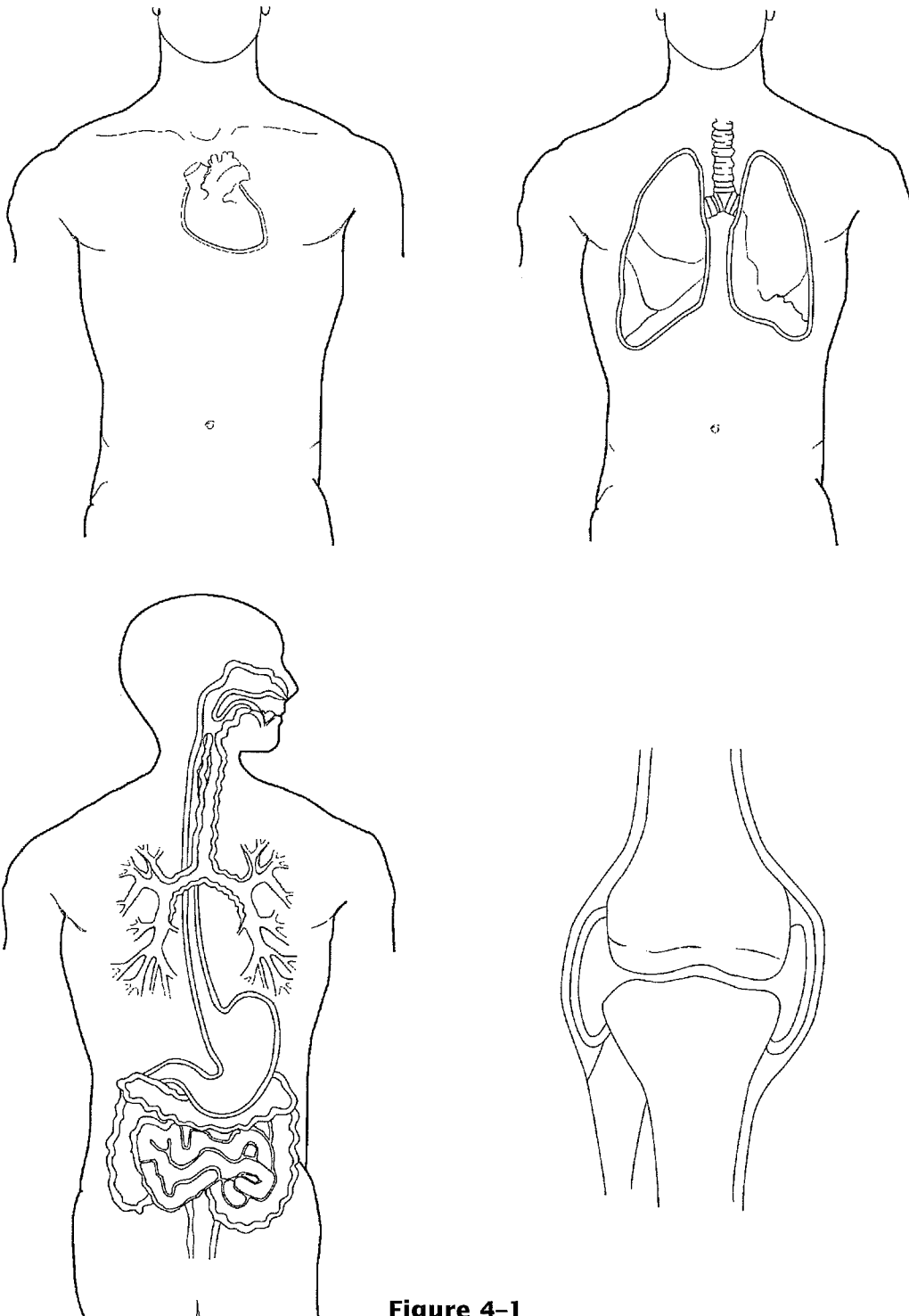


Figure 4-1

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).

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

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

(Assume the sunburn is mild.) _____

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

In your explanation, indicate how their activity is regulated. _____

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

- _____ 1. The cutaneous sensory receptors that reside in the skin are actually part of the (1) system. Four types of stimuli that
- _____ 2. can be detected by certain of the cutaneous receptors are (2), (3), (4), and (5).
- _____ 3.
- _____ 4. Vitamin D is synthesized when modified (6) molecules in the skin are irradiated by (7) light. Vitamin D is important
- _____ 5. in the absorption and metabolism of (8) ions.
- _____ 6.
- _____ 7.
- _____ 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

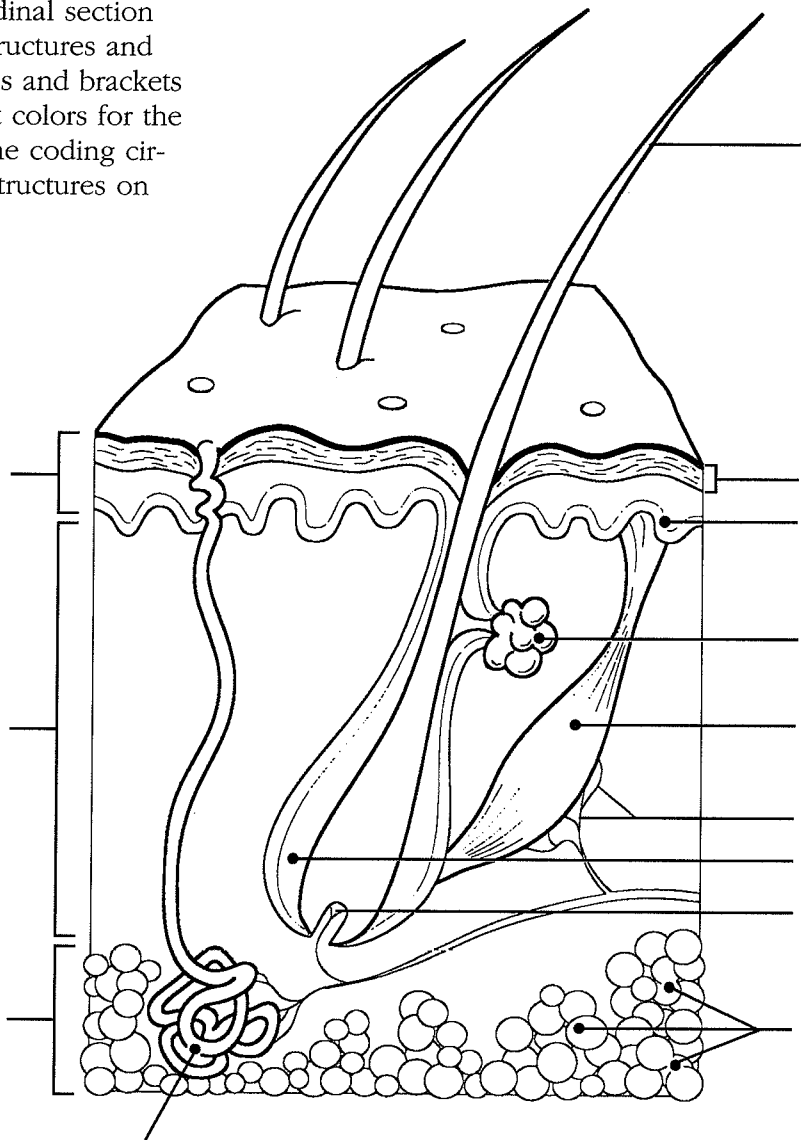


Figure 4-2

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. _____
 2. _____
- _____

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

- _____ 1. Translucent cells, containing keratin
- _____ 2. Strata containing all or mostly dead cells
- _____ 3. Dermis layer responsible for fingerprints
- _____ 4. Vascular region
- _____ 5. Epidermal region involved in rapid cell division; most inferior epidermal layer
- _____ 6. Scalelike cells full of keratin that constantly flake off
- _____ 7. Site of elastic and collagen fibers
- _____ 8. Site of melanin formation
- _____ 9. Major skin area from which the derivatives (hair, nails) arise
- _____ 10. Epidermal layer containing the oldest cells
- _____ 11. When tanned becomes leather

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 | Wart | 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.

- _____ 1. Radiation from the skin surface and evaporation of sweat are two ways in which the skin helps to get rid of body (1).
- _____ 2. Fat in the (2) tissue layer beneath the dermis helps to insulate the body.
- _____ 3. A vitamin that is manufactured in the skin is (3).
- _____ 4. Wrinkling of the skin is caused by loss of the (4) of the skin.
- _____ 5. A decubitus ulcer results when skin cells are deprived of (5).
- _____ 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.

- _____ 1. A saltwater solution is secreted by sebaceous glands.
- _____ 2. The most abundant protein in dead epidermal structures such as hair and nails is melanin.
- _____ 3. Sebum is an oily mixture of lipids, cholesterol, and cell fragments.
- _____ 4. The externally observable part of a hair is called the root.
- _____ 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

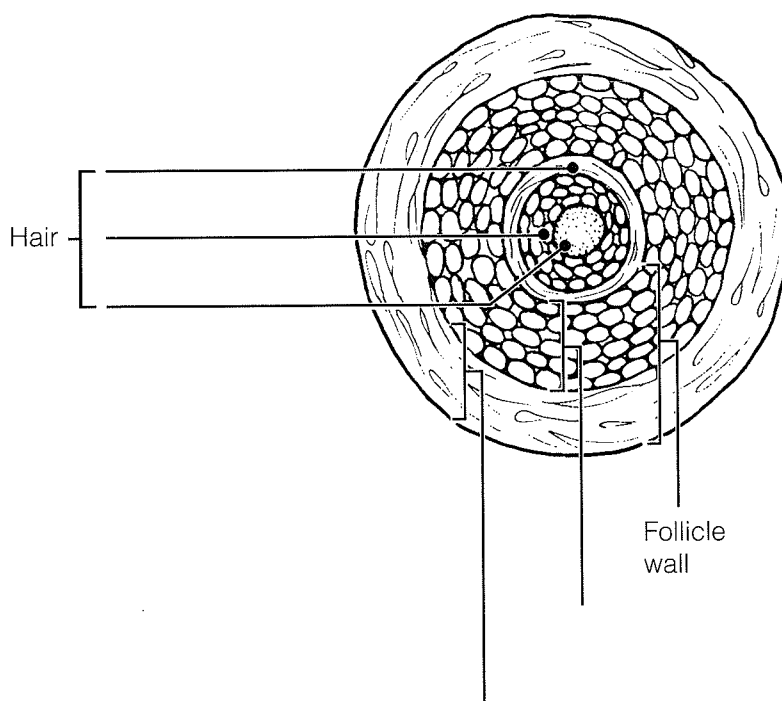


Figure 4-3

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? _____

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?

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

- _____ 1. Full-thickness burn; epidermal and dermal layers destroyed; skin is blanched
- _____ 2. Blisters form
- _____ 3. Epidermal damage, redness, and some pain (usually brief)
- _____ 4. Epidermal and some dermal damage; pain; regeneration is possible
- _____ 5. Regeneration impossible; requires grafting
- _____ 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?

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

- _____ 1. Epithelial cells, not in contact with the basement membrane, develop lesions; metastasize
- _____ 2. Cells of the lowest level of the epidermis invade the dermis and hypodermis; exposed areas develop ulcer; slow to metastasize
- _____ 3. Rare but often deadly cancer of pigment-producing cells

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

DEVELOPMENTAL ASPECTS OF THE SKIN AND BODY MEMBRANES

24. Match the choices (letters or terms) in Column B with the appropriate descriptions in Column A.

Column A	Column B
_____ 1. Skin inflammations that increase in frequency with age	A. Acne
_____ 2. Cause of graying hair	B. Cold intolerance
_____ 3. Small white bumps on the skin of newborn babies, resulting from accumulations of sebaceous gland material	C. Dermatitis
_____ 4. Reflects the loss of insulating subcutaneous tissue with age	D. Delayed-action gene
_____ 5. A common consequence of accelerated sebaceous gland activity during adolescence	E. Lanugo
_____ 6. Oily substance produced by the fetus's sebaceous glands	F. Milia
_____ 7. The hairy "cloak" of the fetus	G. Vernix caseosa



INCREDIBLE JOURNEY

A Visualization Exercise for the Skin

Your immediate surroundings resemble huge grotesquely twisted vines . . . you begin to climb upward.

25. Where necessary, complete statements by inserting the missing words in the answer blanks.

- _____ 1. For this trip, you are miniaturized for injection into your host's skin. Your journey begins when you are deposited in a soft gel-like substance. Your immediate surroundings resemble huge grotesquely twisted vines. But when you peer carefully at the closest "vine," you realize you are actually seeing con-
- _____ 2.

nective tissue fibers. Although tangled together, most of the fibers are fairly straight and look like strong cables. You identify these as the (1) fibers. Here and there are fibers that resemble coiled springs. These must be the (2) fibers that help give skin its springiness. At this point,