

# Tissues

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## I. Principle Types of Tissues

**Concept:** Tissues, groups of similar cells that perform a common function, are classified into four principal kinds on the basis of their cellular arrangement and function.

Objective 1: Define the term *tissue*.

Objective 2: Identify the four major categories of tissues and discuss the basic structure and function of each type.

Objective 3: Describe the basic process of embryonic tissue development.

### Multiple Choice Questions

- \_\_\_ 1. A tissue is:
  - a. a membrane that lines body cavities.
  - b. a group of similar cells that perform a common function.
  - c. a thin sheet of cells embedded in a matrix.
  - d. the most complex organizational unit of the body.
  
- \_\_\_ 2. The four principle types of tissues include all of the following *except*:
  - a. nervous.
  - b. muscle.
  - c. cartilage.
  - d. connective.
  
- \_\_\_ 3. The most complex tissue in the body is:
  - a. muscle.
  - b. blood.
  - c. connective.
  - d. nervous.
  
- \_\_\_ 4. The nonliving intercellular material that surrounds tissues is called:
  - a. intercellular ether.
  - b. matrix.
  - c. lacunae.
  - d. none of the above
  
- \_\_\_ 5. The hollow ball of cells that forms after fertilization is referred to as:
  - a. primary germ layer.
  - b. blastocyst.
  - c. gastrulation.
  - d. none of the above

- \_\_\_ 6. Which tissue lines body cavities and protects body surfaces?
- epithelial
  - connective
  - muscular
  - nervous

### True-False Questions

- \_\_\_ 7. The biology of tissues is referred to as *histology*.
- \_\_\_ 8. The process of the primary germ layers of the embryo differentiating into specific tissues is called *gastrulation*.
- \_\_\_ 9. Sweat and sebaceous glands are formed by connective tissue.
- \_\_\_ 10. The three primary germ layers are endoderm, ectoderm, and mesoderm.

## II. Epithelial Tissue

**Concepts:** Epithelial tissue is subdivided in two types: membranous (covering or lining) epithelium and glandular epithelium.

The functions of epithelial tissue are protection, sensation, secretion, absorption, and excretion.

- Objective 4: Identify important structural and functional generalizations that apply to epithelium.
- Objective 5: Classify membranous epithelium by virtue of shape and arrangement.
- Objective 6: Discuss each classification of membranous epithelium in terms of its structure, function, and location in the body.
- Objective 7: Discuss glandular epithelium by comparing the structure and function of endocrine and exocrine glands.

### Multiple Choice Questions

- \_\_\_ 11. Which of the following is *not* a primary function of membranous epithelium?
- secretion
  - protection
  - absorption
  - excretion
- \_\_\_ 12. Which of the following is *not* a structural example of epithelium?
- stratified squamous
  - simple transitional
  - stratified columnar
  - pseudostratified columnar
- \_\_\_ 13. The simple columnar epithelium lining the intestines contains plasma membranes that extend into thousands of microscopic extensions called:
- villi.
  - microvilli.
  - cilia.
  - flagella.

- \_\_\_ 14. Epithelial cells can be classified according to shape. Which of the following is *not* a characteristic shape of epithelium?
- cuboidal
  - rectangular
  - squamous
  - columnar
- \_\_\_ 15. Keratinized stratified squamous epithelium is found in the:
- mouth.
  - vagina.
  - epidermis.
  - vagina.
- \_\_\_ 16. Endocrine glands discharge their products into:
- body cavities.
  - blood.
  - organ surfaces.
  - none of the above
- \_\_\_ 17. Which of the following is *not* a functional classification of exocrine glands?
- alveolar
  - apocrine
  - holocrine
  - merocrine
- \_\_\_ 18. The functional classification of salivary glands is:
- endocrine.
  - apocrine.
  - holocrine.
  - merocrine.
- \_\_\_ 19. This epithelial tissue readily allows diffusion, as in the linings of blood and lymphatic vessels.
- simple squamous
  - stratified squamous
  - simple columnar
  - pseudostratified columnar

### True-False Questions

- \_\_\_ 20. Epithelial tissue is attached to an underlying layer of connective tissue called the basement membrane.
- \_\_\_ 21. Epithelium is rich with blood supply.
- \_\_\_ 22. Exocrine glands discharge their secretion products directly into the blood.

## Matching

Match each arrangement of epithelial cells with its corresponding description.

- |  |                              |
|--|------------------------------|
| ___ 23. single layer of cube-shaped cells  | a. simple squamous           |
| ___ 24. multiple layers of cells with flat cells at the outer surface  | b. simple cuboidal           |
| ___ 25. single layer of cells in which some are tall and thin and able to reach the free surface, whereas others are not | c. simple columnar           |
| ___ 26. layers of cells that appear cubelike when an organ is relaxed and flattened when the organ is distended by fluid | d. pseudostratified columnar |
| ___ 27. single layer of flat, scalelike cells  | e. stratified squamous       |
| ___ 28. single layer of tall, thin cells   | f. stratified cuboidal       |
|  | g. stratified columnar       |
|  | h. transitional              |

## Labeling

Label the following images (Figures 5-1 through 5-5) and identify the principle tissue type of each. Be as specific as possible. Consult your textbook if you need assistance.

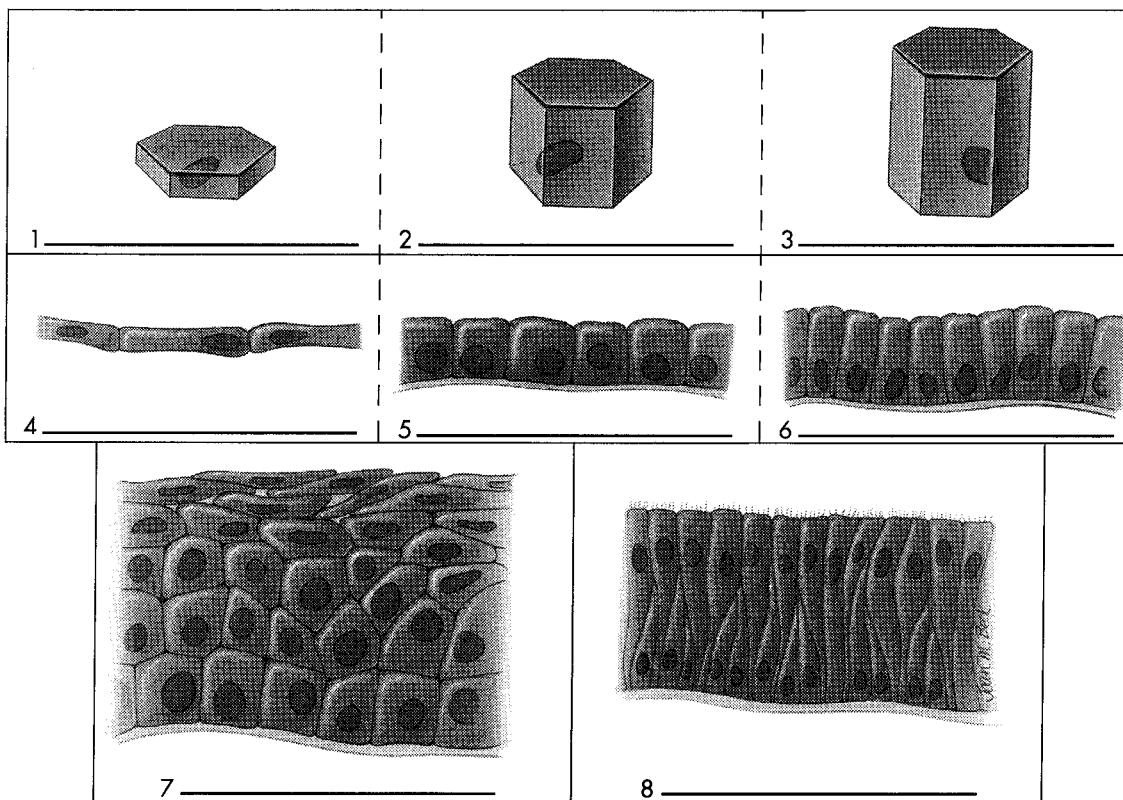
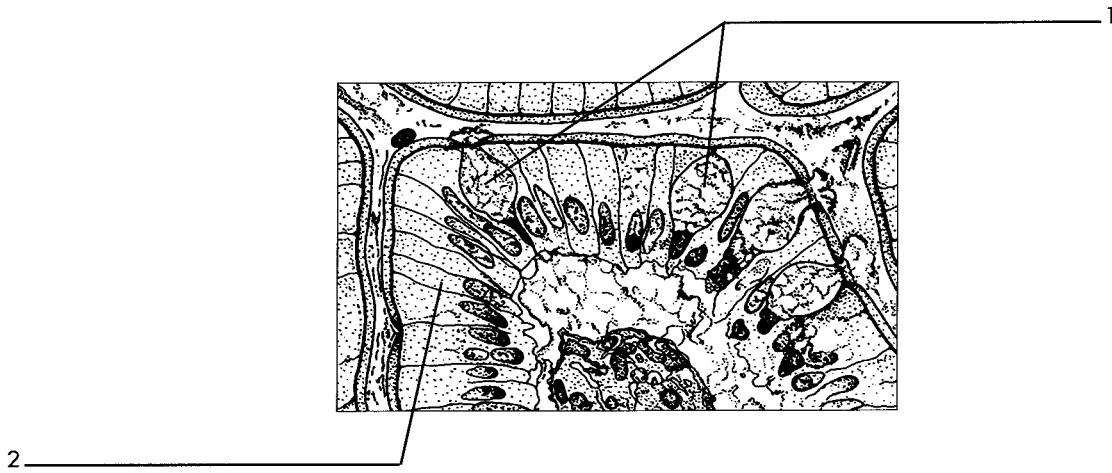


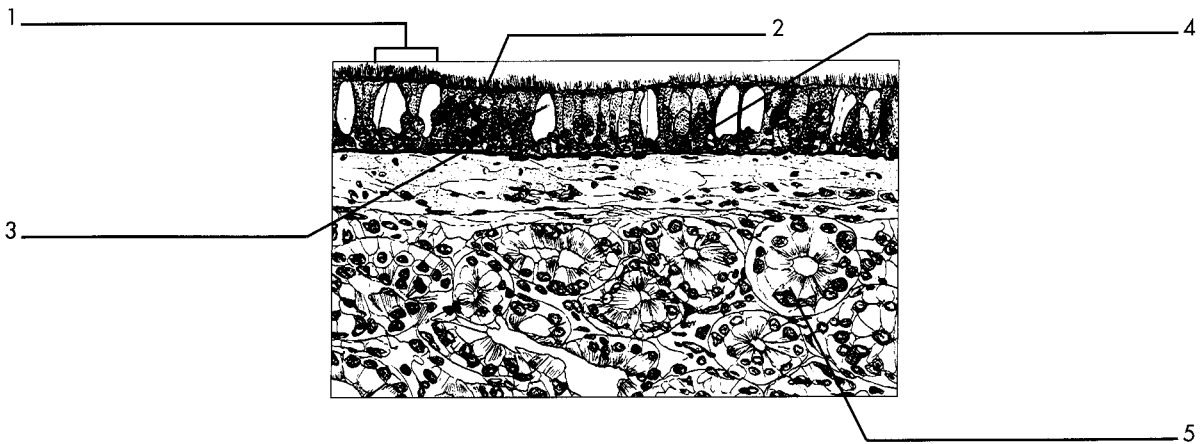
Figure 5-1 Tissue type: \_\_\_\_\_



**Figure 5-2** Tissue type: \_\_\_\_\_



**Figure 5-3** Tissue type: \_\_\_\_\_



**Figure 5-4** Tissue type: \_\_\_\_\_

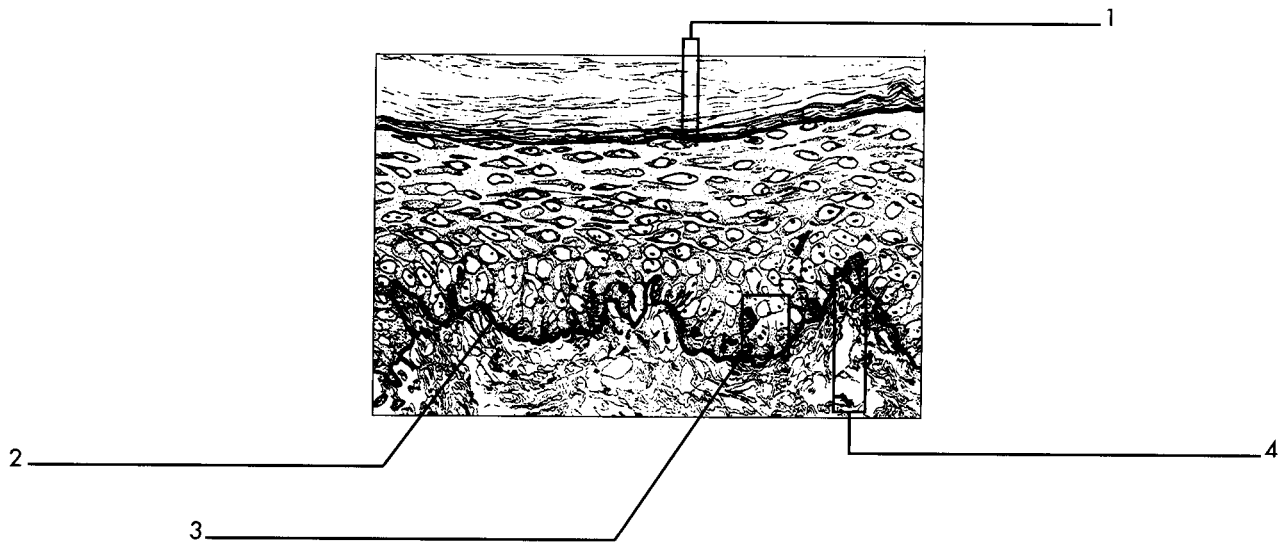


Figure 5-5 Tissue type: \_\_\_\_\_

### III. Connective Tissue

**Concepts:** Connective tissue is one of the most widespread and diverse tissue types in the body.  
 Connective tissue connects, supports, transports, and defends the body.  
 Connective tissues are classified by their matrix or intercellular material.

Objective 8: Outline the connective tissue classification scheme.

Objective 9: Histologically identify and give functional examples for each type of connective tissue.

#### Multiple Choice Questions

- \_\_\_ 29. Which of the following is *not* an example of connective tissue?
- transitional
  - reticular
  - blood
  - bone
- \_\_\_ 30. Which of the following fibers is not found in connective tissue matrix?
- collagenous
  - elastic
  - fibroblastic
  - reticular
- \_\_\_ 31. Superficial fascia is composed of which type of connective tissue?
- adipose
  - areolar
  - reticular
  - dense

- \_\_\_ 32. Adipose tissue performs each of the following functions *except*:
- insulation.
  - protection.
  - energy storage.
  - immune protection.
- \_\_\_ 33. Which of the following connective tissue types forms the framework of the spleen, lymph nodes, and bone marrow?
- loose
  - adipose
  - reticular
  - areolar
- \_\_\_ 34. The mature cells of bone are called:
- fibroblasts.
  - osteoclasts.
  - osteoblasts.
  - osteocytes.
- \_\_\_ 35. The basic structural unit of bone is the microscopic:
- osteon.
  - lacunae.
  - lamellae.
  - canaliculi.
- \_\_\_ 36. Mature bone grows and is reshaped by the simultaneous activity of which two cells?
- osteoblasts and osteocytes
  - osteoblasts and osteoclasts
  - osteocytes and osteoclasts
  - none of the above
- \_\_\_ 37. The most prevalent type of cartilage is:
- hyaline cartilage.
  - fibrous cartilage.
  - elastic cartilage.
  - none of the above
- \_\_\_ 38. Which of the following is *not* released by injured tissues?
- histamine
  - serotonin
  - kinins
  - All of the above are released by injured tissue.

### True-False Questions

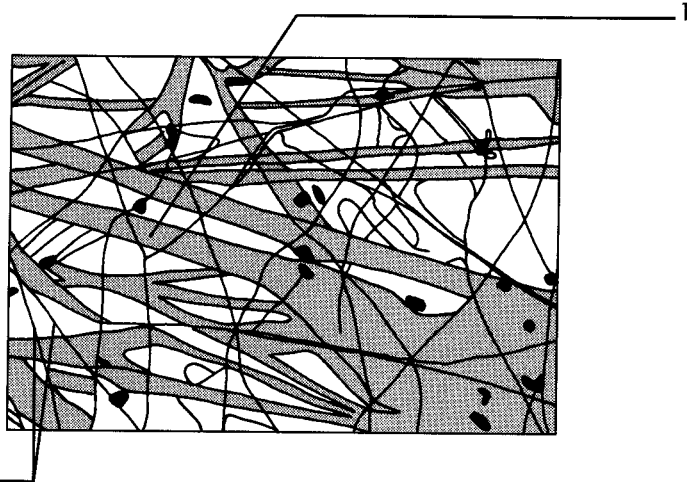
- \_\_\_ 39. The most prevalent types of cells in areolar connective tissue are fibroblasts and macrophages.
- \_\_\_ 40. The terms *osteon* and *Haversian system* are synonymous.
- \_\_\_ 41. The long bones of the body are formed through the process of intramembraneous ossification.
- \_\_\_ 42. Cartilage is perhaps the most vascular tissue in the human body.

\_\_\_ 43. Many researchers believe that one of the most basic factors in the aging process is the change in the molecular structure of collagen.

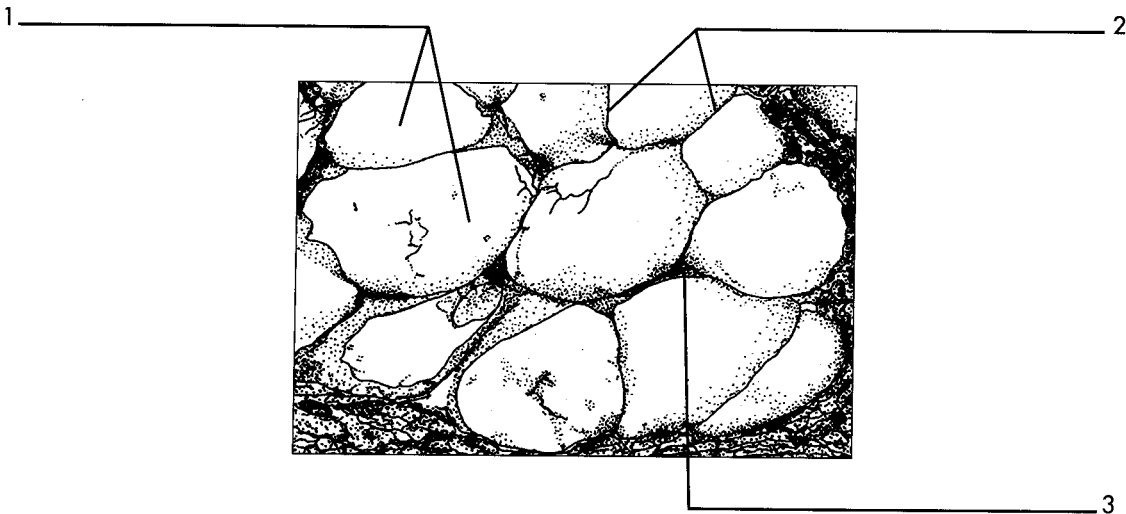
\_\_\_ 44. The greater a person's weight while immersed, the higher the body-fat percentage.

### Labeling

*Label the following images (Figures 5-6 through 5-10) and identify the principle tissue type of each. Be as specific as possible. Consult your textbook if you need assistance.*

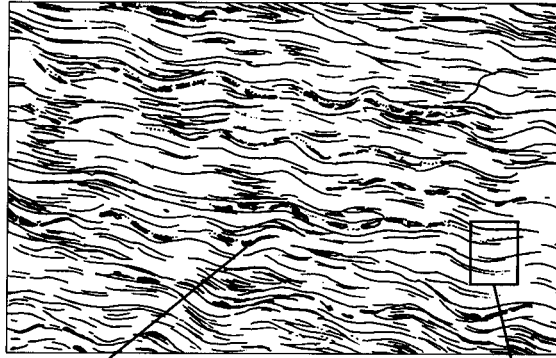


**Figure 5-6** Tissue type: \_\_\_\_\_



**Figure 5-7** Tissue type: \_\_\_\_\_





1 \_\_\_\_\_ 2

**Figure 5-8** Tissue type: \_\_\_\_\_



1 \_\_\_\_\_ 2

3 \_\_\_\_\_

**Figure 5-9** Tissue type: \_\_\_\_\_



1 \_\_\_\_\_

**Figure 5-10** Tissue type: \_\_\_\_\_

## IV. Muscle Tissue

**Concept:** Muscle cells are the movement specialists of the body. They have a greater ability to contract (or shorten) than do the cells of any other tissue.

Objective 10: Histologically identify and give functional examples for each of the three types of muscle tissues in the body.

### Matching

Match each type of muscle tissue with its corresponding definition or description.

- |   |                    |
|---|--------------------|
| ___ 45. cylindrical, striated, voluntary cells                                  | a. cardiac muscle  |
| ___ 46. nonstriated, involuntary, narrow fibers with only one nucleus per fiber | b. skeletal muscle |
| ___ 47. striated, branching, involuntary cells with intercalated disks          | c. smooth muscle   |
| ___ 48. responsible for body movement   |                    |
| ___ 49. also called <i>visceral muscle</i>                                      |                    |
| ___ 50. found in the walls of hollow internal organs                            |                    |

### Labeling

Label the following images (Figures 5-11 and 5-12) and identify the principle tissue type of each. Be as specific as possible. Consult your textbook if you need assistance.

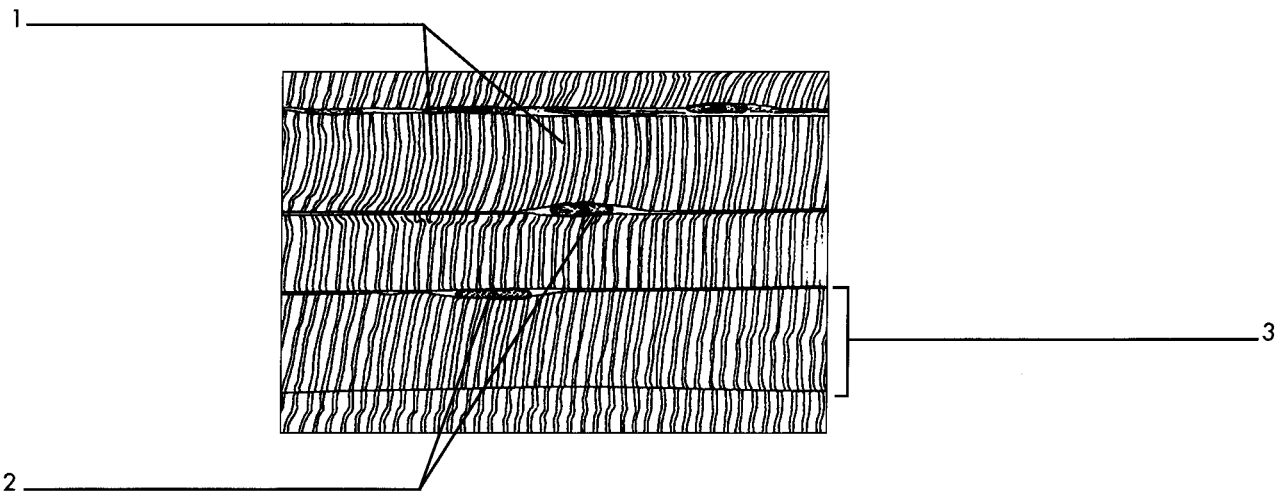
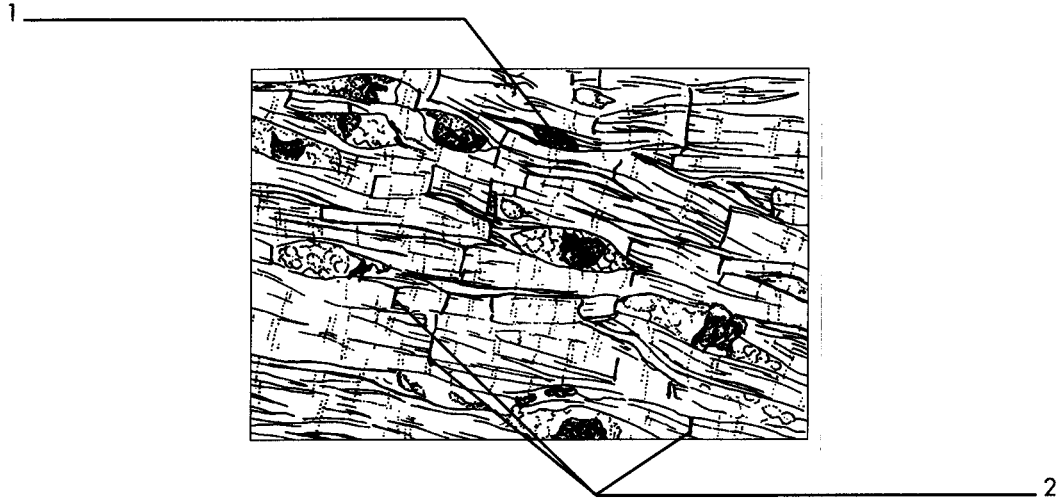


Figure 5-11 Tissue type: \_\_\_\_\_



**Figure 5-12** Tissue type: \_\_\_\_\_

## V. Nervous Tissue

**Concepts:** Nervous tissue forms the brain, spinal cord, and nerves.

Nervous tissue has developed more excitability and conductivity characteristics than any other tissue in the body.

Nervous tissue consists of two basic kinds of cells: neurons and neuroglia.

Objective 11: Compare characteristics of neurons and neuroglia in terms of nervous system function.

Objective 12: Histologically identify the components of a neuron.

### Matching

*Match each term with its corresponding definition or description.*

- |   |              |
|---|--------------|
| ___ 51. the cell body of the neuron                                       | a. neuron    |
| ___ 52. supportive cells  | b. neuroglia |
| ___ 53. cell process that transmit nerve impulses away from the cell body | c. axon      |
| ___ 54. the conducting cells of the nervous system                        | d. soma      |
| ___ 55. cell process that carries nerve impulses toward the cell body     | e. dendrite  |

## Labeling

Label the following image and identify the principle tissue type. Be as specific as possible. Consult your textbook if you need assistance.

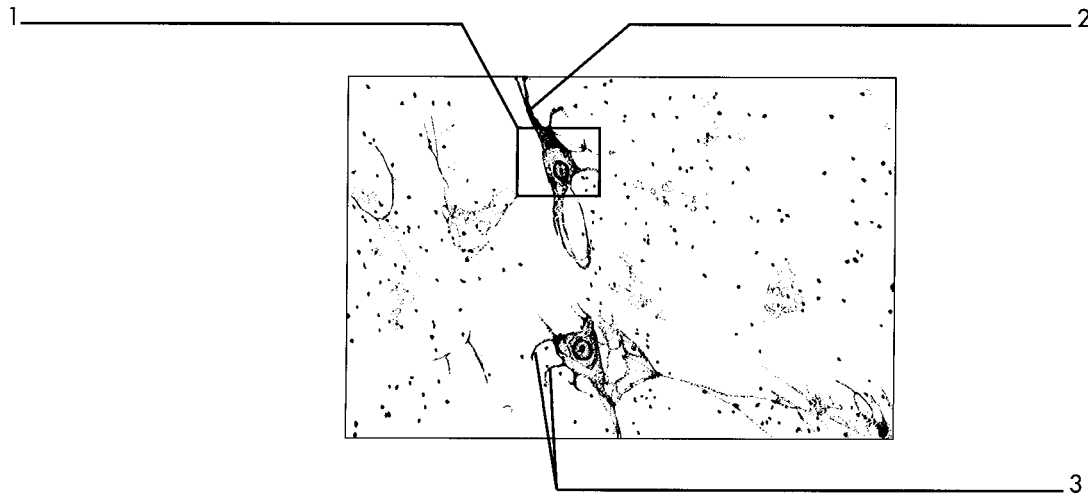


Figure 5-13 Tissue type: \_\_\_\_\_

## VI. Tissue Repair

**Concepts:** Tissues have a varying capacity to repair themselves. Damaged tissue will regenerate or be replaced by scar tissue.

The inflammatory response mobilizes the body's defenses and removes foreign materials and damaged cells so that tissue repair can proceed.

Objective 13: Explain the process of regeneration as it relates to tissue repair.

## Matching

Match each term with its corresponding definition or description.

- |  |                 |
|--|-----------------|
| ___ 56. process by which white blood cells engulf and destroy bacteria                   | a. calor        |
| ___ 57. redness indicating increased blood flow and pooling of blood following injury    | b. regeneration |
| ___ 58. growth of new tissue (as opposed to scarring)                                    | c. edema        |
| ___ 59. heat resulting from the increased blood flow to the area of injury               | d. rubor        |
| ___ 60. attraction of leukocytes   | e. histamine    |
| ___ 61. pain   | f. dolor        |
| ___ 62. chemical causing increased blood vessel permeability                             | g. keloid       |
| ___ 63. an unusually thick scar  | h. phagocytosis |
| ___ 64. increased number of white blood cells  | leukocytosis    |
| ___ 65. the presence of abnormally large amounts of fluid in intercellular tissue spaces | j. chemotaxis   |