

NAME _____ LAB TIME/DATE _____

REVIEW SHEET
exercise

6A

Classification of Tissues

Tissue Structure and Function—General Review

1. Define *tissue*: A group of cells similar to one another in structure and function.

2. Use the key choices to identify the major tissue types described below.

Key: a. connective tissue b. epithelium c. muscle d. nervous tissue

b; epithelium 1. lines body cavities and covers the body's external surface

c; muscle 2. pumps blood, flushes urine out of the body, allows one to swing a bat

d; nervous c; muscle 3. transmits electrochemical impulses

a; connective 4. anchors, packages, and supports body organs

b; epithelium 5. cells may absorb, secrete, and filter

d; nervous 6. most involved in regulating and controlling body functions

c; muscle 7. major function is to contract

b; epithelium 8. synthesizes hormones

a; connective 9. the most durable tissue type

a; connective 10. abundant nonliving extracellular matrix

a; connective 11. most widespread tissue in the body

d; nervous 12. forms nerves and the brain

Epithelial Tissue

3. Describe five general characteristics of epithelial tissue. The cells fit closely together, forming sheetlike membranes. Little intercellular material between the cells. Avascular; the membrane has a free edge. Generally has a high regenerative capacity.

4. On what bases are epithelial tissues classified? Cellular arrangement and cell shape.

5. List the six major functions of epithelium in the body, and give examples of each. *(a) Protection—stratified squamous epithelium (epidermis) of skin and ciliated epithelium of the trachea; (b) absorption and (c) secretion—mucosa of digestive tract; (d) filtration and (e) excretion— kidney tubule epithelium; (f) sensory reception—free dendritic endings of sensory neurons.*

6. How is the function of epithelium reflected in its arrangement? *Stratified epithelia are usually present where increased protection is necessary or stretching occurs. Simple epithelia generally have absorptive or secretory functions.*

7. Where is ciliated epithelium found? *Lining of the respiratory tract and of the male and female reproductive tracts (vas deferens and uterine tubes, respectively).*

What role does it play? *In the respiratory tract, it acts to sweep mucus superiorly away from the lungs. In the reproductive tract, it acts to propel sperm or ova (male and female tracts respectively) along the tract.*

8. Transitional epithelium is actually stratified squamous epithelium, but there is something special about it. How does it differ structurally from other stratified squamous epithelia? *The surface cells are “plump” rather than flattened.*

How does this reflect its function in the body? *The surface cells have the ability to slide over one another, increasing the internal volume of the organ (e.g. bladder) as it fills.*

9. How do the endocrine and exocrine glands differ in structure and function? *Endocrine glands are ductless glands. They produce hormones, which are liberated directly to the blood. Exocrine glands maintain their ducts and manufacture secretions of various types (perspiration, oil, digestive enzymes, etc.), which are ducted to the body (or membrane) surface.*

10. Respond to the following with the key choices.

- | | | | |
|------|---------------------------------------|--------------------|------------------------|
| Key: | a. pseudostratified ciliated columnar | c. simple cuboidal | e. stratified squamous |
| | b. simple columnar | d. simple squamous | f. transitional |

e; stratified squamous _____ 1. lining of the esophagus

- b; simple columnar _____ 2. lining of the stomach
- d; simple squamous _____ 3. alveolar sacs of lungs
- c; simple cuboidal _____ 4. tubules of the kidney
- e; stratified squamous _____ 5. epidermis of the skin
- f; transitional _____ 6. lining of bladder; peculiar cells that have the ability to slide over each other
- d; simple squamous _____ 7. forms the thin serous membranes; a single layer of flattened cells

Connective Tissue

11. What are three general characteristics of connective tissues? Connective tissue is composed of many diverse cell types. The bulk of most connective tissue is nonliving extracellular material (matrix) produced by the cells and then extruded to their exterior. The matrix provides the strength and supportive function associated with connective tissues. Most types are well vascularized.

12. What functions are performed by connective tissue? Protection, support, and the binding together of other body tissues.

13. How are the functions of connective tissue reflected in its structure? Living cells are soft and fragile. The large amount of non-living matrix (containing fibers) seen provides the strength needed for the normal functions of connective tissues.

14. Using the key, choose the best response to identify the connective tissues described below.

- | | | |
|-----------------------------------|---|--|
| <u>c; dense</u> _____ | 1. attaches bones to bones and muscles to bones | Key: a. adipose connective tissue b. areolar connective tissue c. dense connective tissue d. elastic cartilage e. fibrocartilage f. hematopoietic tissue g. hyaline cartilage h. osseous tissue |
| <u>a; adipose</u> _____ | 2. acts as a storage depot for fat | |
| <u>c; dense</u> _____ | 3. the dermis of the skin | |
| <u>e; fibrocartilage</u> _____ | 4. makes up the intervertebral discs | |
| <u>h; osseous</u> _____ | 5. forms your hip bone | |
| <u>b; areolar</u> _____ | 6. composes basement membranes; a soft packaging tissue with a jellylike matrix | |
| <u>g; hyaline cartilage</u> _____ | 7. forms the larynx, the costal cartilages of the ribs, and the embryonic skeleton | |
| <u>d; elastic cartilage</u> _____ | 8. provides a flexible framework for the external ear | |
| <u>g; hyaline cartilage</u> _____ | 9. firm, structurally amorphous matrix heavily invaded with fibers; appears glassy and smooth | |
| <u>h; osseous</u> _____ | 10. matrix hard owing to calcium salts; provides levers for muscles to act on | |
| <u>a; adipose</u> _____ | 11. insulates against heat loss | |

15. Why do adipose cells remind people of a ring with a single jewel? They contain a large fat-filled vacuole occupying most of the cell volume. The nucleus is pushed to the periphery, giving the cell a "signet ring" appearance.

Muscle Tissue

16. The three types of muscle tissue exhibit similarities as well as differences. Check the appropriate space in the chart to indicate which muscle types exhibit each characteristic.

| Characteristic | Skeletal | Cardiac | Smooth |
|---|----------|---------|--------|
| Voluntarily controlled | ✓ | | |
| Involuntarily controlled | | ✓ | ✓ |
| Striated | ✓ | ✓ | |
| Has a single nucleus in each cell | | ✓ | ✓ |
| Has several nuclei per cell | ✓ | | |
| Found attached to bones | ✓ | | |
| Allows you to direct your eyeballs | ✓ | | |
| Found in the walls of the stomach, uterus, and arteries | | | ✓ |
| Contains spindle-shaped cells | | | ✓ |
| Contains branching cylindrical cells | | ✓ | |
| Contains long, nonbranching cylindrical cells | ✓ | | |
| Has intercalated discs | | ✓ | |
| Concerned with locomotion of the body as a whole | ✓ | | |
| Changes the internal volume of an organ as it contracts | | ✓ | ✓ |
| Tissue of the heart | | ✓ | |

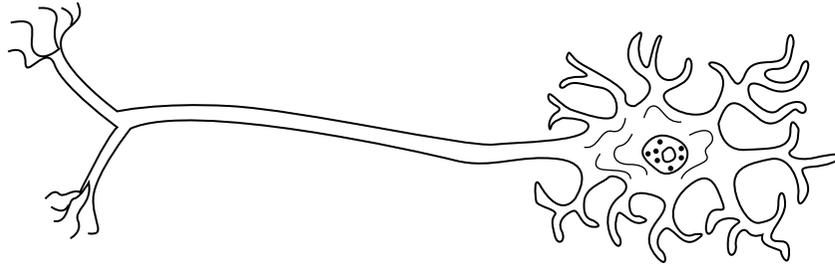
Nervous Tissue

17. What two physiological characteristics are highly developed in neurons (nerve cells)? Irritability and conductivity.

18. In what ways are neurons similar to other cells? They contain a nucleus and the usual organelles.

How are they different? Their cytoplasm is drawn out into long processes.

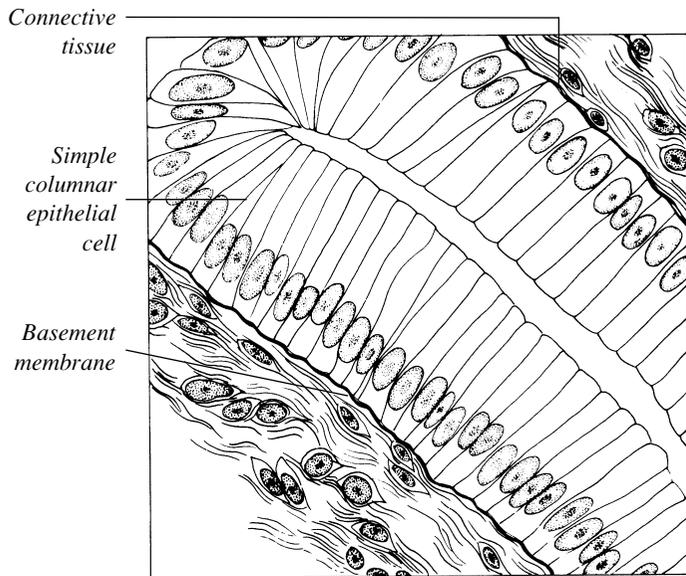
19. Sketch a neuron, recalling in your diagram the most important aspects of its structure. Below the diagram, describe how its particular structure relates to its function in the body.



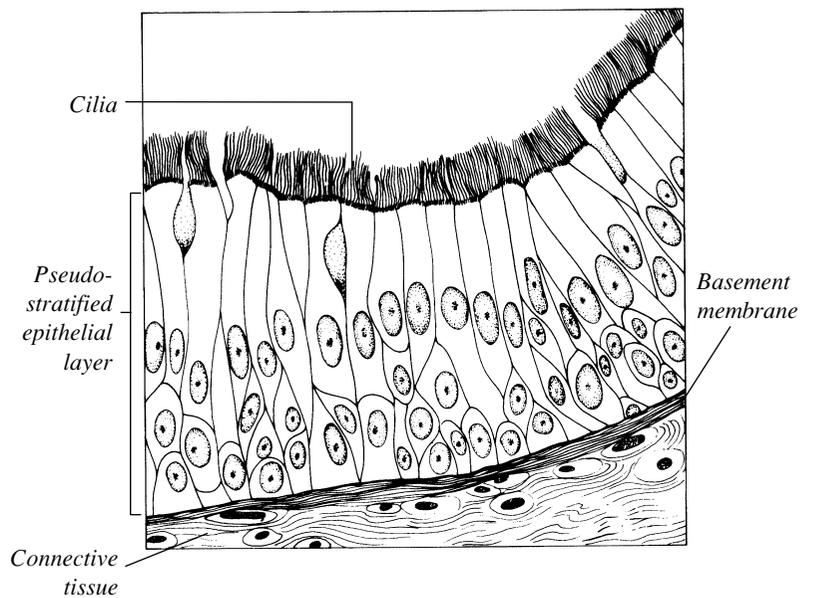
Neurons conduct impulses over relatively long distances in the body. This is facilitated by their long cytoplasmic extensions.

For Review

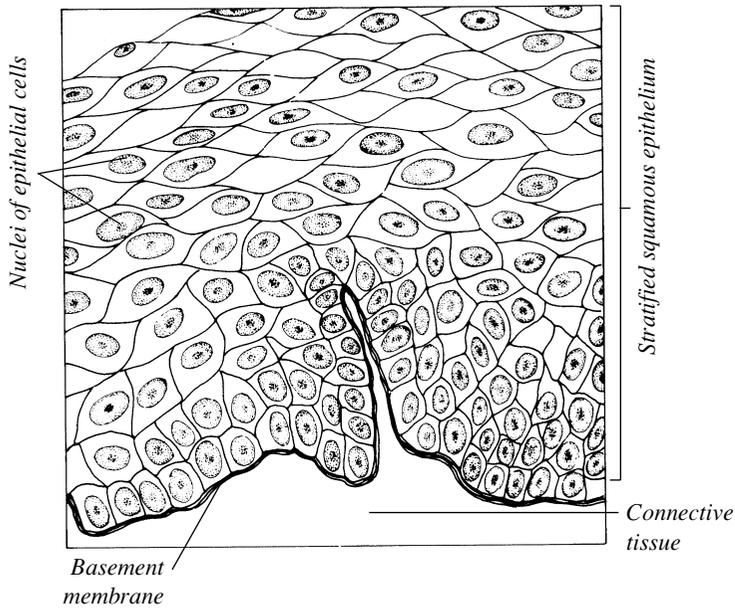
20. Label the following tissue types here and on the next pages, and identify all major structures—cell types, matrix (ground substance and fibers), fat vacuole, basement membrane—if present.



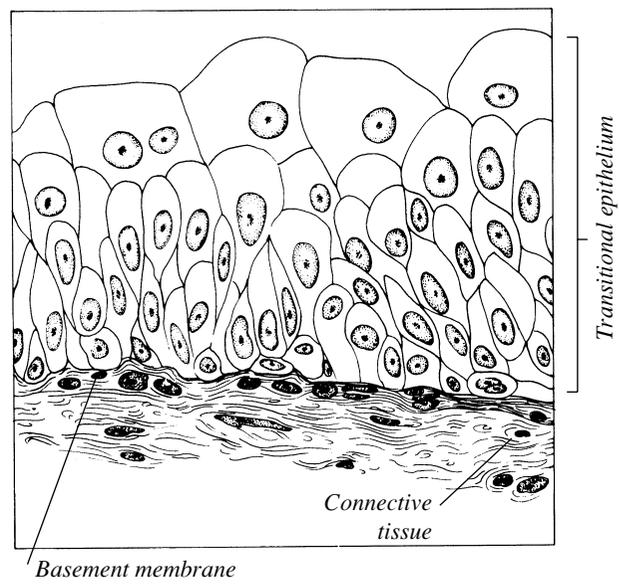
(a) Simple columnar epithelial



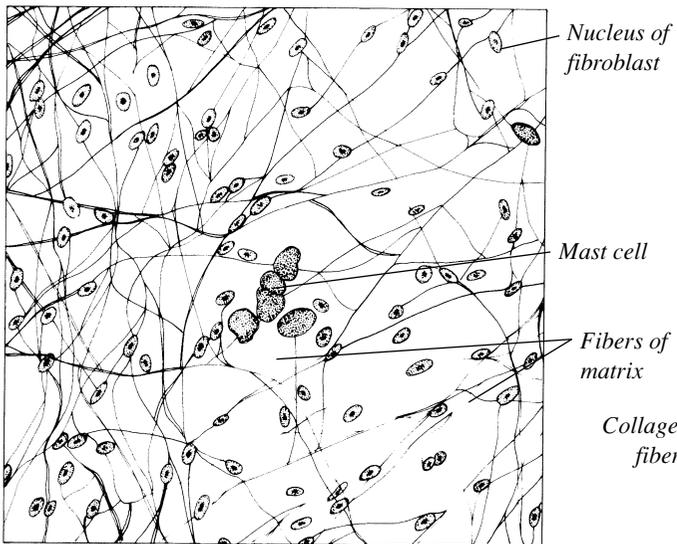
(b) Pseudostratified ciliated columnar epithelial



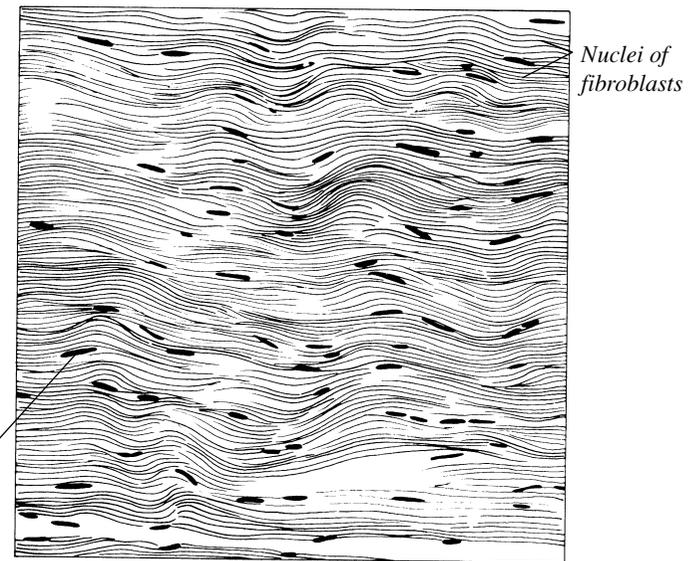
(c) *Stratified squamous epithelial*



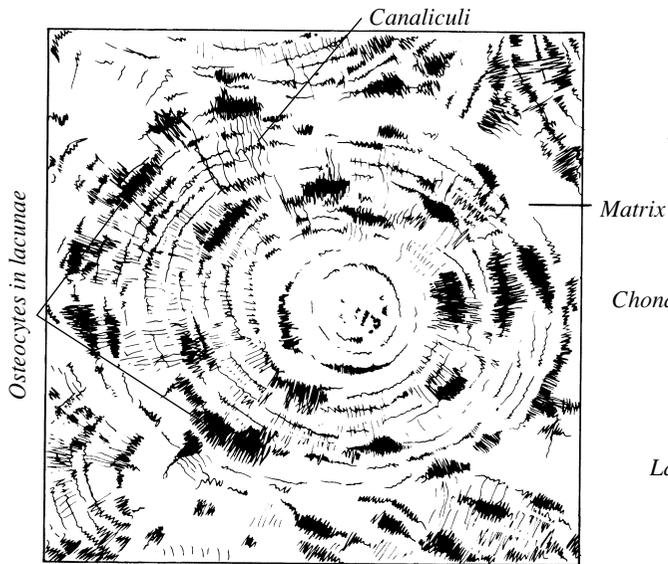
(d) *Transitional epithelial*



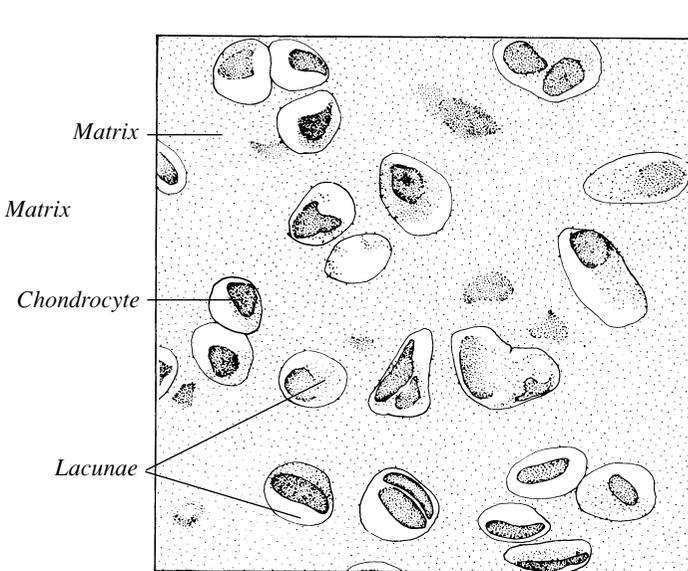
(e) *Areolar connective tissue*



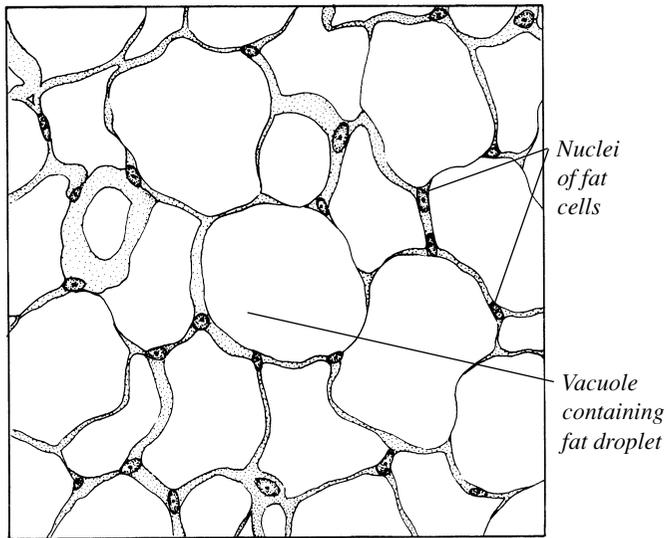
(f) *Dense fibrous connective*



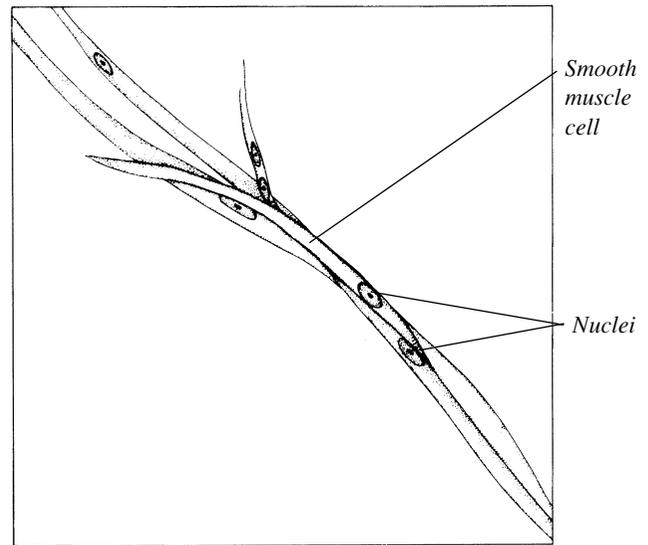
(g) *Osseous tissue*



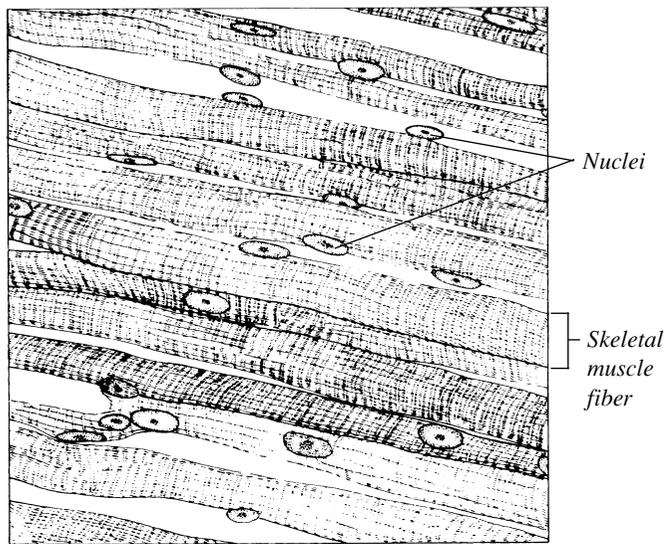
(h) *Hyaline cartilage*



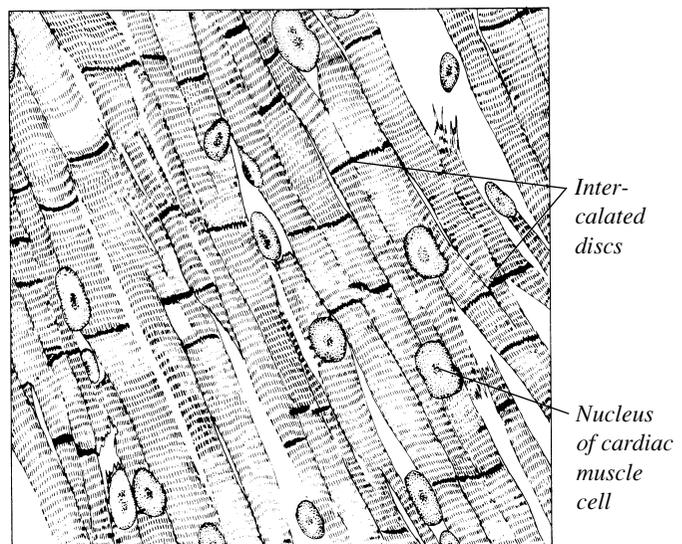
(i) *Adipose tissue*



(j) *Smooth muscle tissue*



(k) *Skeletal muscle tissue*



(l) *Cardiac muscle tissue*