

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 that perform a common or related 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

- | | |
|-----------------------------|--|
| <u>b; epithelium</u> | 1. lines body cavities and covers the body's external surface |
| <u>c; muscle</u> | 2. pumps blood, flushes urine out of the body, allows one to swing a bat |
| <u>d; nervous c; muscle</u> | 3. transmits electrochemical impulses |
| <u>a; connective</u> | 4. anchors, packages, and supports body organs |
| <u>b; epithelium</u> | 5. cells may absorb, secrete, and filter |
| <u>d; nervous</u> | 6. most involved in regulating and controlling body functions |
| <u>c; muscle</u> | 7. major function is to contract |
| <u>b; epithelium</u> | 8. synthesizes hormones |
| <u>a; connective</u> | 9. the most durable tissue type |
| <u>a; connective</u> | 10. abundant nonliving extracellular matrix |
| <u>a; connective</u> | 11. most widespread tissue in the body |
| <u>d; nervous</u> | 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. Membrane has a free edge. Generally has a high
regenerative capacity.

4. On what basis are epithelial tissues classified? Number of layers and cell shape.

5. List five major functions of epithelium in the body, and give examples of each.

Function 1: protection Example: skin

Function 2: absorption Example: cells lining digestive tract

Function 3: filtration and secretion Example: kidney tubule cells

Function 4: secretion Example: glandular cells or kidney cells

Function 5: sensory reception Example: free endings of sensory neurons

6. How does the function of stratified epithelia differ from the function of simple epithelia? Stratified epithelia have more layers for protection. Simple epithelia allow materials to move across them and are less protective.

7. Where is ciliated epithelium found? Lining of the respiratory tract and of the male and female reproductive tracts (ductus 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 with special characteristics.

How does it differ structurally from other stratified squamous epithelia? When stretched, its top layers are squamous, but when not stretched, its top layers are pillow shaped.

How does the structural difference support its function? The surface cells have the ability to slide over one another, increasing the internal volume of the organ (e.g., bladder) as it fills and maintaining an intact lining whether stretched or contracted.

9. How do the endocrine and exocrine glands differ in structure and function? Endocrine glands are ductless glands. They produce hormones, which are liberated into the extracellular fluid to enter 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. simple squamous
b. simple cuboidal

c. simple columnar
d. pseudostratified ciliated columnar

e. stratified squamous
f. transitional

e; stratified squamous 1. lining of the esophagus

c; simple columnar 2. lining of the stomach

- a; simple squamous 3. alveolar sacs of lungs
- b; 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
- a; 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? Common origin of connective tissue from mesenchyme, varied degrees of vascularity, and a large amount of extracellular matrix that varies with tissue type all characterize connective tissue.
12. What functions are performed by connective tissue? Protection, support, and the binding together of other body tissues. Transportation of substances within the body.
13. How are the functions of connective tissue reflected in its structure? There is a wide variety in the structures of connective tissue. This is reflected in the wide variety of functions they perform. Also, the large amount of nonliving matrix seen provides the strength needed to protect the body and carry out the normal functions of the body.
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 fibrous connective tissue
d. elastic cartilage
e. elastic
f. fibrocartilage
g. hematopoietic tissue
h. hyaline cartilage
i. 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>f; fibrocartilage</u> | 4. makes up the intervertebral discs | |
| <u>i; osseous</u> | 5. forms the hip bone | |
| <u>b; areolar</u> | 6. composes basement membranes; a soft packaging tissue with a jellylike matrix | |
| <u>h; 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>h; hyaline cartilage</u> | 9. firm, structurally amorphous matrix heavily invaded with fibers; appears glassy and smooth | |
| <u>i; 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 | |
| <u>e; elastic</u> | 12. walls of large arteries | |
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.

Nervous Tissue

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

17. 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.

18. Describe how the unique structure of a neuron 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.

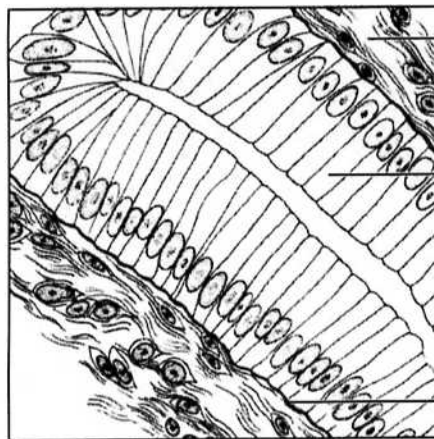
Muscle Tissue

19. 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		✓	

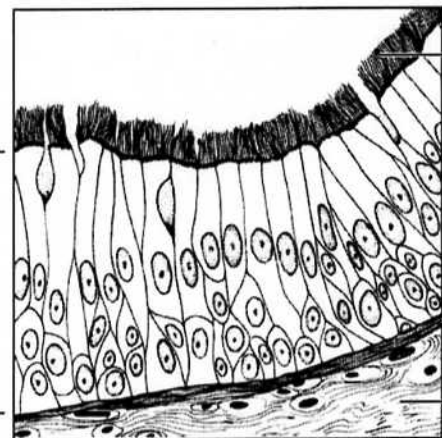
For Review

20. Label the tissue types illustrated here and on the next page, and identify all structures provided with leaders.



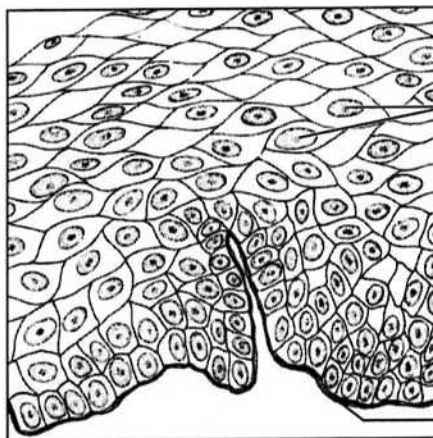
(a) Simple columnar epithelial

Connective tissue
Simple columnar epithelial cell
Pseudostratified epithelial layer
Basement membrane



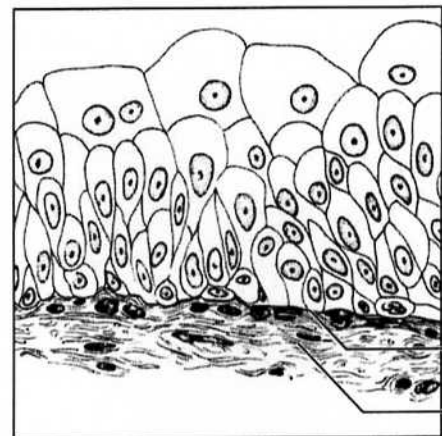
(b) Pseudostratified ciliated columnar epithelial

Cilia
Basement membrane
Connective tissue



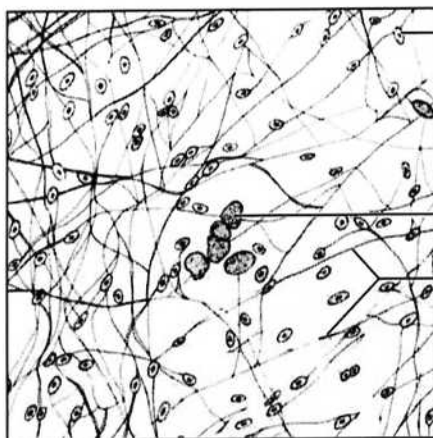
(c) Stratified squamous epithelial

Nuclei of epithelial cells
Basement membrane



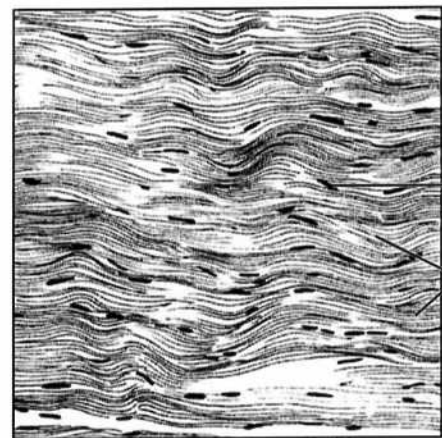
(d) Transitional epithelial

Basement membrane
Connective tissue



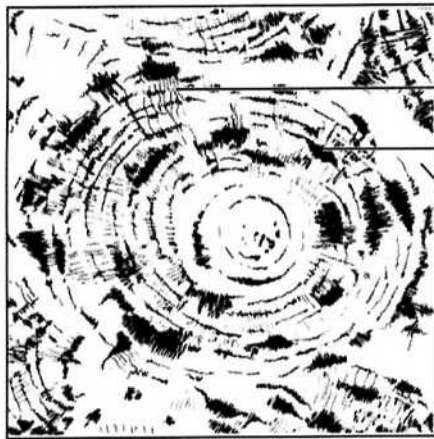
(e) Areolar connective tissue

Nucleus of fibroblast
Mast cell
Fibers of matrix



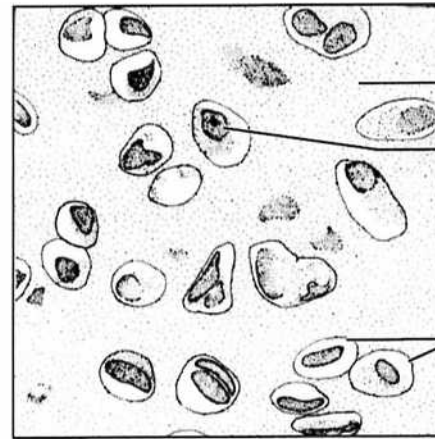
(f) Dense fibrous connective tissue, or dense regular connective tissue

Nucleus of fibroblast
Collagen fibers



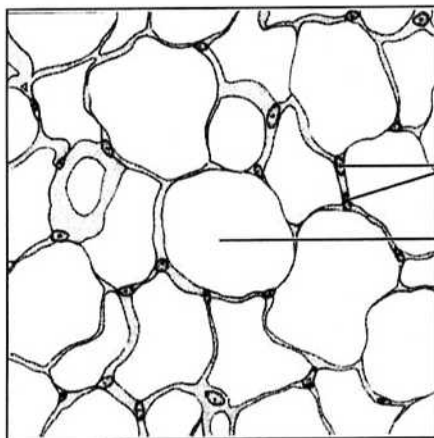
Canaliculi
Lacuna
Matrix

(g) Bone (osseous tissue)



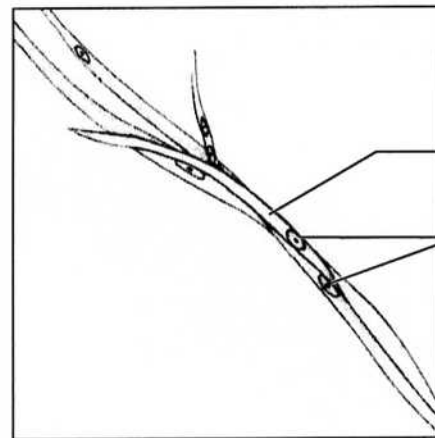
Matrix
Chondrocyte
Lacunae

(h) Hyaline cartilage



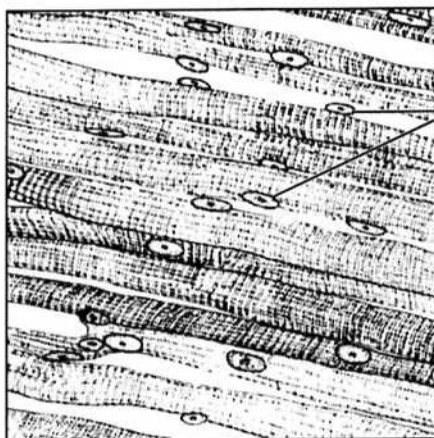
Nuclei of
fat cells
Vacuole
containing
fat droplet

(i) Adipose tissue



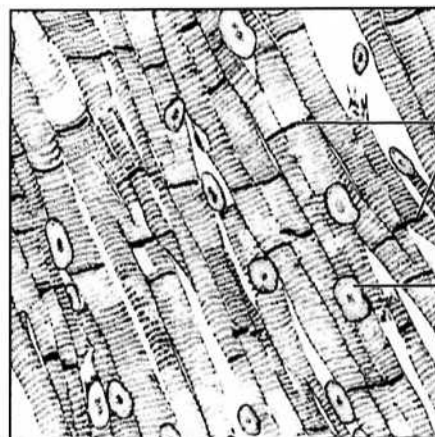
Smooth
muscle
cell
Nuclei

(j) Smooth muscle tissue



Nuclei
Skeletal
muscle fiber
(cell)

(k) Skeletal muscle tissue



Inter-
calated
discs
Nucleus
of cardiac
muscle
cell

(l) Cardiac muscle tissue