LABORATORY EXERCISE

9

Connective Tissues

MATERIALS NEEDED

Textbook
Compound light microscope
Prepared slides of the following:
- Areolar tissue
- Adipose tissue
- Reticular connective tissue
- Dense connective tissue (regular type)
- Elastic connective tissue
- Hyaline cartilage
- Elastic cartilage
- Fibrocartilage
- Bone (compact, ground, cross section)
- Blood (human smear)

Colored pencils

PURPOSE OF THE EXERCISE

To review the characteristics of connective tissues and to observe examples of the major types.

LEARNING OUTCOMES AP R

After completing this exercise, you should be able to

1. Differentiate the special characteristics of each of the major types of connective tissue.
2. Sketch and label the characteristics of connective tissues that you were able to observe.
3. Indicate a location and function of each type of connective tissue.
4. Identify the major types of connective tissues on microscope slides.

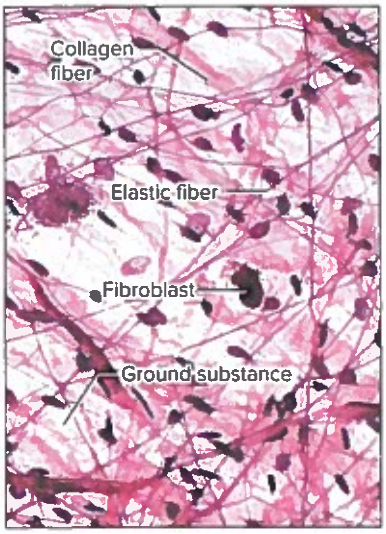
Connective tissues contain a variety of cell types and occur in all regions of the body. They bind structures together, provide support and protection, fill spaces, store fat, and produce blood cells.

Connective tissue cells are often widely scattered in an abundance of extracellular matrix. The matrix consists of fibers and a ground substance of various densities and consistencies. Many of the prepared slides contain more than the tissue to be studied, so be certain that your view matches the correct tissue. Additional study of bone and blood will be found in Laboratory Exercises 12 and 37.

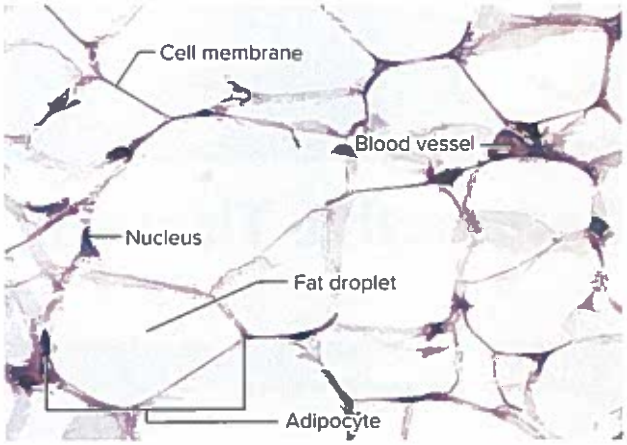
PRACTICE

PROCEDURE—Connective Tissues AP R

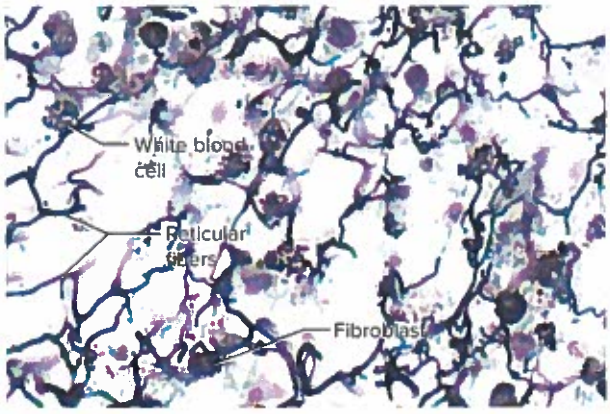
1. Review the section entitled "Connective Tissues" in chapter 5 of the textbook.
2. Complete Part A of Laboratory Report 9.
3. Use a microscope to observe the prepared slides of various connective tissues. As you observe each tissue, look for its special distinguishing features as described in the textbook. Compare your prepared slides of connective tissues to the micrographs in figure 9.1. As you observe each type of connective tissue, prepare a labeled sketch of a representative portion of the tissue in Part B of the laboratory report.
4. Complete Part B of the laboratory report.
5. Test your ability to recognize each of these connective tissues by having a laboratory partner select a slide, cover its label, and focus the microscope on this tissue. Then see if you can correctly identify the tissue. A



(a) Areolar tissue (from beneath the skin) (800×)

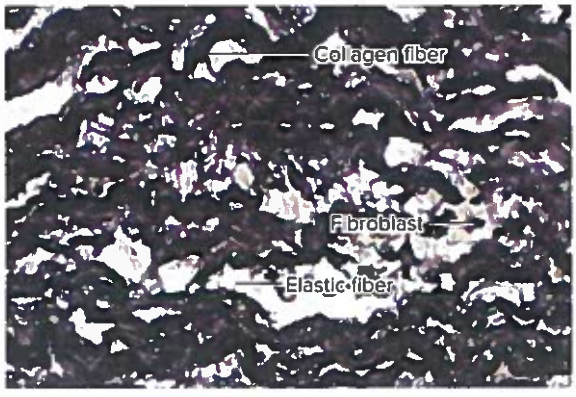


(b) Adipose tissue (from subcutaneous layer) (400×)

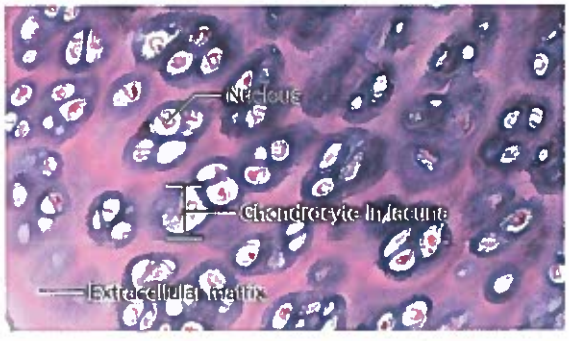


(c) Reticular connective tissue (from spleen) (1,000×)

(d) Dense regular connective tissue (from tendon) (500×)

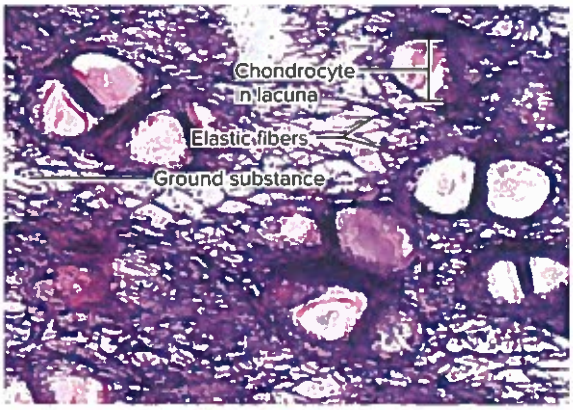


(e) Elastic connective tissue (from artery wall) (160×)

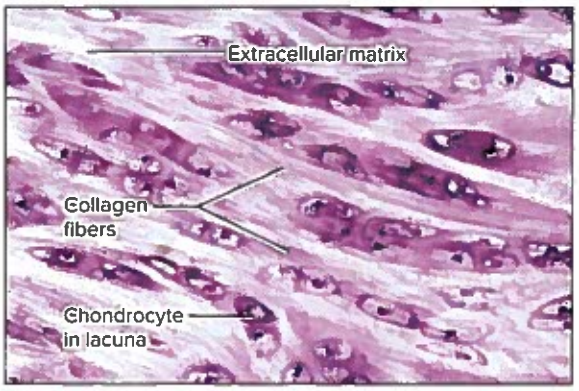


(f) Hyaline cartilage (from costal cartilage of ribs) (160×)

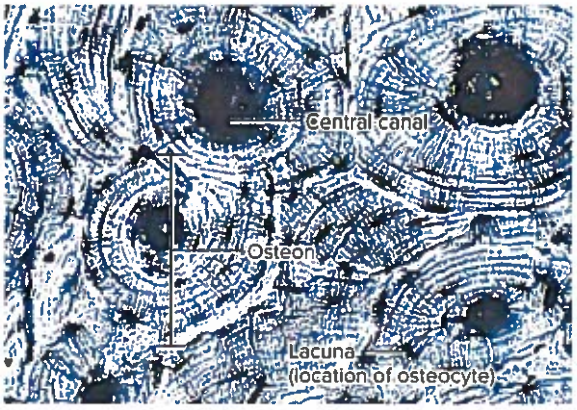
FIGURE 9.1 Micrographs of connective tissues *(a–j)*. APR ((a, b, j) ©McGraw-Hill Education/Al Telser, photographer; (c, e, f, g, i) ©Ed Reschke; (d) ©Ed Reschke/Photolibrary/Getty Images; (h) ©Victor P. Eroschenko)



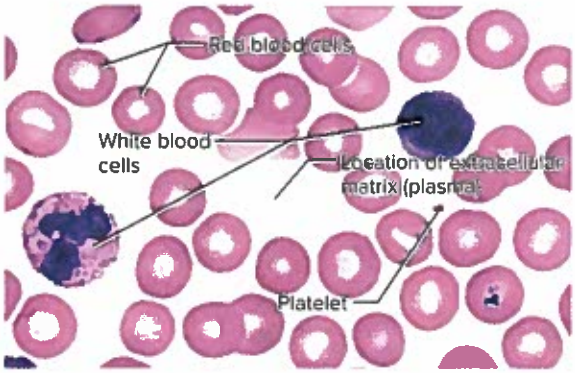
(g) Elastic cartilage (from ear) (400×)



(h) Fibrocartilage (from intervertebral discs) (400×)



(i) Compact bone (from skeleton) (200×)



(j) Blood (400×)

FIGURE 9.1 *Continued.* AP R

Notes

Name _____

Date _____

Section _____

The A corresponds to the indicated Learning Outcome(s) found at the beginning of the laboratory exercise.

LABORATORY REPORT 9

Connective Tissues

PART A ASSESSMENTS

Match the tissues in column A with the characteristics in column B. Place the letter of your choice in the space provided. (Some answers may be used more than once.) A1 A3

Column A

a. Adipose tissue
b. Areolar tissue
c. Blood
d. Bone (compact)
e. Dense connective tissue (regular)
f. Elastic cartilage
g. Elastic connective tissue
h. Fibrocartilage
i. Hyaline cartilage
j. Reticular connective tissue

Column B

_____ **1.** Forms framework of outer ear

_____ **2.** Functions as heat insulator beneath skin

_____ **3.** Contains large amounts of fluid and transports nutrients, wastes, and gases

_____ **4.** Cells in solid matrix arranged around central canal

_____ **5.** Binds skin and fills spaces between organs

_____ **6.** Main tissue of tendons and ligaments

_____ **7.** Provides stored energy supply in fat droplets in cytoplasm

_____ **8.** Forms the ends of many long bones

_____ **9.** Pads between vertebrae that are shock absorbers

_____ **10.** Matrix contains collagen fibers and mineral salts

_____ **11.** Occurs in some ligament attachments between vertebrae and larger artery walls

_____ **12.** Forms supporting tissue in walls of liver and spleen

PART B ASSESSMENTS

In the space that follows, sketch a small section of each of the types of connective tissues you observed. For each sketch, label the major characteristics, indicate the magnification used, write an example of a location in the body, and provide a function. 1 2 3

Areolar tissue (____ ×) Location: _____ Function: _____	Adipose tissue (____ ×) Location: _____ Function: _____
Reticular connective tissue (____ ×) Location: _____ Function: _____	Dense connective tissue (regular type) (____ ×) Location: _____ Function: _____
Elastic connective tissue (____ ×) Location: _____ Function: _____	Hyaline cartilage (____ ×) Location: _____ Function: _____

Elastic cartilage (____×) Location: _____ Function: _____	Fibrocartilage (____×) Location: _____ Function: _____
Bone (compact) (____×) Location: _____ Function: _____	Blood (____×) Location: _____ Function: _____

ASSESS

CRITICAL THINKING

Abdominal impact injuries in the region of the LUQ often involve the spleen. Explain the structural tissue characteristics within the spleen that make it so vulnerable to serious injury. A3

_____

_____

_____

_____

LEARN: ACTIVITY

Use colored pencils to differentiate various cellular structures in Part B. Select a different color for the cells, fibers, and ground substance whenever visible.

Notes