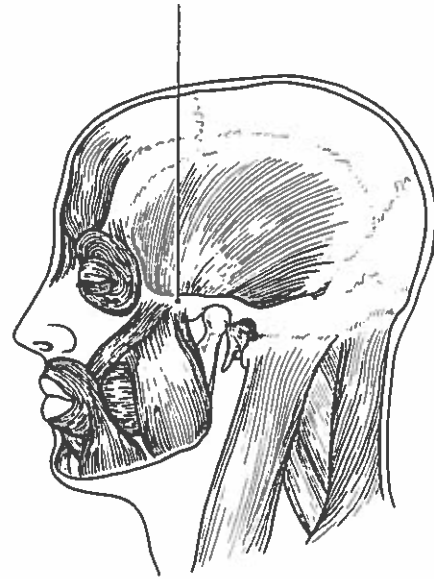


6 THE MUSCULAR SYSTEM



Muscles, the specialized tissues that facilitate body movement, make up about 40% of body weight. Most body muscle is the voluntary type, called skeletal muscle because it is attached to the bony skeleton. Skeletal muscle contributes to body contours and shape, and it composes the organ system called the muscular system. These muscles allow you to grin, frown, run, swim, shake hands, swing a hammer, and to otherwise manipulate your environment. The balance of body muscle consists of smooth and cardiac muscles, which form the bulk of the walls of hollow organs and the heart. Smooth and cardiac muscles are involved in the transport of materials within the body.

Study activities in this chapter deal with microscopic and gross structure of muscle, identification of voluntary muscles, body movements, and important understandings of muscle physiology.

OVERVIEW OF MUSCLE TISSUES

1. Nine characteristics of muscle tissue are listed below and on page 104. Identify the muscle tissue type described by choosing the correct response(s) from the key choices. Enter the appropriate term(s) or letter(s) of the key choice in the answer blank.

Key Choices

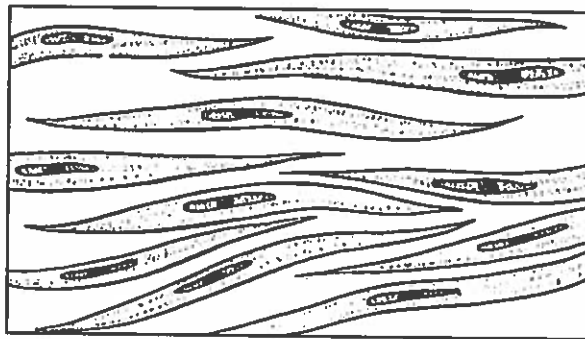
A. Cardiac B. Smooth C. Skeletal

- _____ 1. Involuntary
- _____ 2. Banded appearance
- _____ 3. Longitudinally and circularly arranged layers
- _____ 4. Dense connective tissue packaging
- _____ 5. Figure eight packaging of the cells
- _____ 6. Coordinated activity to act as a pump

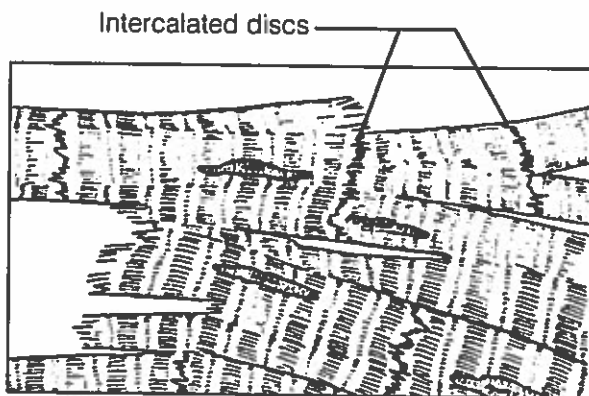


- _____ 7. Moves bones and the facial skin
- _____ 8. Referred to as the muscular system
- _____ 9. Voluntary

2. Identify the type of muscle in each of the illustrations in Figure 6-1. Color the diagrams as you wish.



A _____



B _____

Figure 6-1

3. Regarding the functions of muscle tissues, circle the term in each of the groupings that does not belong with the other terms.

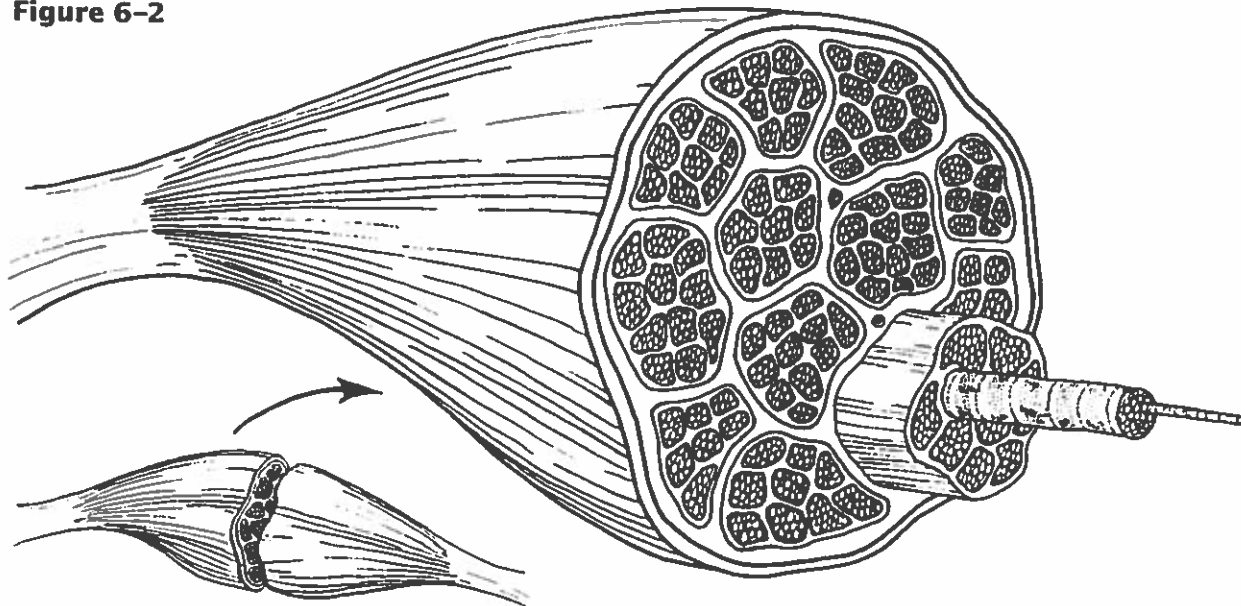
- | | | | |
|-----------------------|------------------------|-----------------|-----------------------------|
| 1. Urine | Foodstuffs | Bones | Smooth muscle |
| 2. Heart | Cardiac muscle | Blood pump | Promotes labor during birth |
| 3. Excitability | Response to a stimulus | Contractility | Action potential |
| 4. Ability to shorten | Contractility | Pulls on bones | Stretchability |
| 5. Maintains posture | Movement | Promotes growth | Generates heat |

MICROSCOPIC ANATOMY OF SKELETAL MUSCLE

4. First, identify the structures in Column B by matching them with the descriptions in Column A. Enter the correct letters (or terms if desired) in the answer blanks. Then, select a different color for each of the terms in Column B that has a color-coding circle and color in the structures on Figure 6-2.

| Column A | Column B |
|--|-------------------------------------|
| _____ 1. Connective tissue surrounding a fascicle | A. Endomysium <input type="radio"/> |
| _____ 2. Connective tissue ensheathing the entire muscle | B. Epimysium <input type="radio"/> |
| _____ 3. Contractile unit of muscle | C. Fascicle |
| _____ 4. A muscle cell | D. Fiber <input type="radio"/> |
| _____ 5. Thin connective tissue investing each muscle cell | E. Myofilament |
| _____ 6. Plasma membrane of the muscle cell | F. Myofibril <input type="radio"/> |
| _____ 7. A long, filamentous organelle found within muscle cells that has a banded appearance | G. Perimysium <input type="radio"/> |
| _____ 8. Actin- or myosin-containing structure | H. Sarcolemma |
| _____ 9. Cordlike extension of connective tissue beyond the muscle, serving to attach it to the bone | I. Sarcomere |
| _____ 10. A discrete bundle of muscle cells | J. Sarcoplasm |
| | K. Tendon <input type="radio"/> |

Figure 6-2



5. Figure 6-3 is a diagrammatic representation of a small portion of a relaxed muscle cell (bracket indicates the portion enlarged). First, select different colors for the structures listed below. Use them to color the coding circles and corresponding structures on Figure 6-3. Then bracket and label an A band, an I band, and a sarcomere. When you have finished, draw a contracted sarcomere in the space beneath the figure and label the same structures, as well as the light and dark bands.

- Myosin Actin filaments Z disc

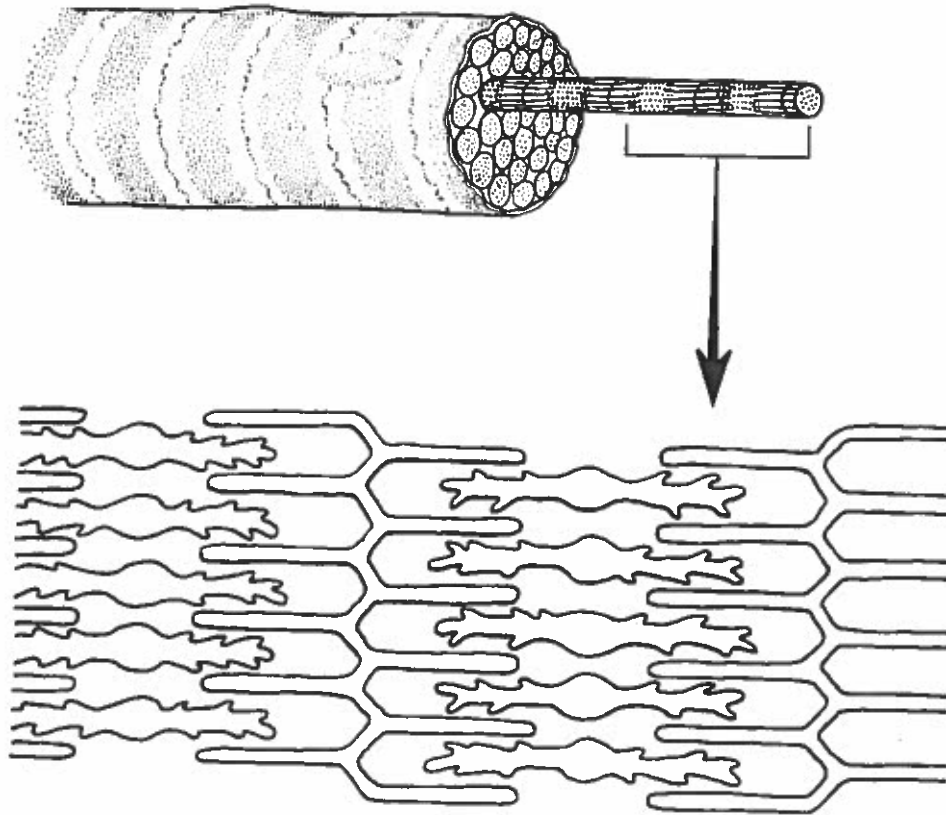


Figure 6-3

- _____ 1. Looking at your diagram of a contracted sarcomere from a slightly different angle, which region of the sarcomere shortens during contraction—the dark band, the light band, or both?