

# 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 is 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-8 packaging of the cells
- \_\_\_\_\_ 6. Coordinated activity to act as a pump

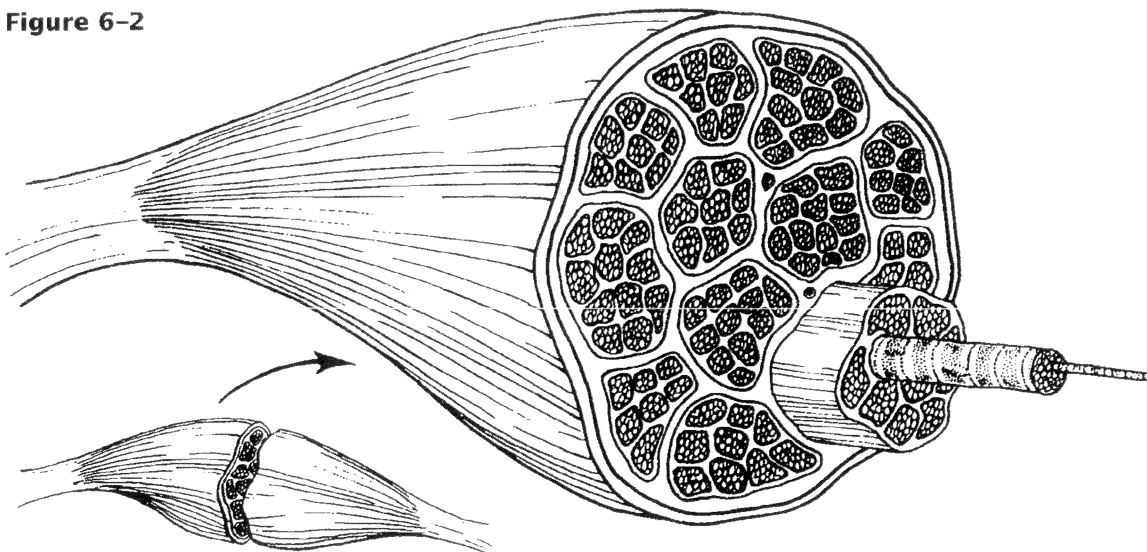


## MICROSCOPIC ANATOMY OF SKELETAL MUSCLE

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 <input type="radio"/>
_____ 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

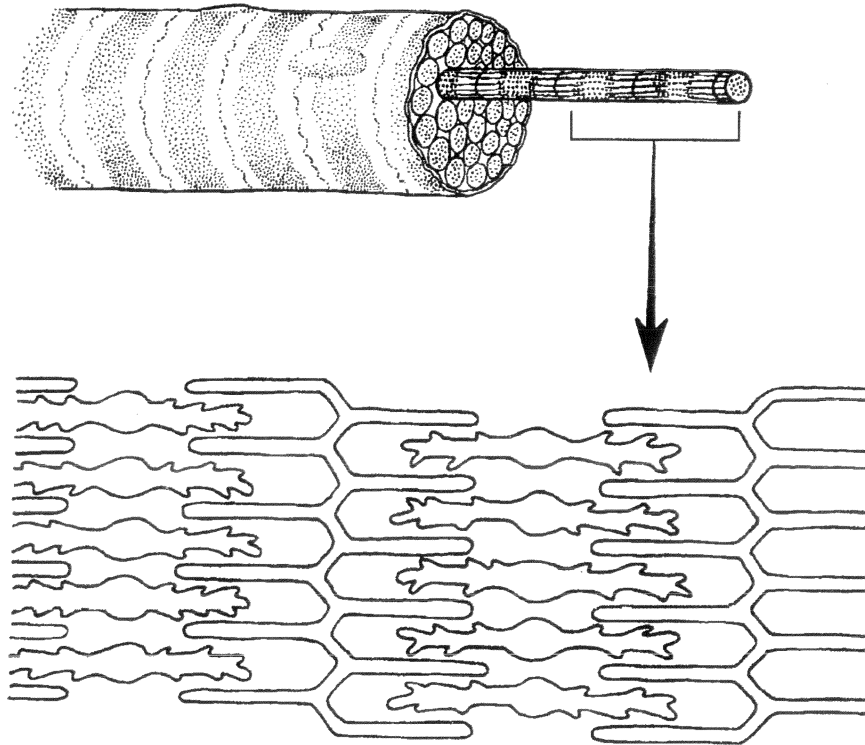


Figure 6-3

- \_\_\_\_\_ 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?

17. Several criteria are applied to the naming of muscles. These are provided in Column B. Identify which criteria pertain to the muscles listed in Column A and enter the correct letter(s) in the answer blank.

Column A	Column B
_____ 1. Gluteus maximus	A. Action of the muscle
_____ 2. Adductor magnus	B. Shape of the muscle
_____ 3. Biceps femoris	C. Location of the muscle's origin and/or insertion
_____ 4. Transversus abdominis	D. Number of origins
_____ 5. Extensor carpi ulnaris	E. Location of muscle relative to a bone or body region
_____ 6. Trapezius	F. Direction in which the muscle fibers run relative to some imaginary line
_____ 7. Rectus femoris	G. Relative size of the muscle
_____ 8. External oblique	

## GROSS ANATOMY OF THE SKELETAL MUSCLES

### Muscles of the Head

18. Identify the major muscles described in Column A by choosing a response from Column B. Enter the correct letter in the answer blank. Select a different color for each muscle described and color in the coding circle and corresponding muscle on Figure 6-6.

Column A	Column B
<input type="radio"/> _____ 1. Used in smiling	A. Buccinator
<input type="radio"/> _____ 2. Used to suck in your cheeks	B. Frontalis
<input type="radio"/> _____ 3. Used in winking	C. Masseter
<input type="radio"/> _____ 4. Used to form the horizontal frown crease on the forehead	D. Orbicularis oculi
<input type="radio"/> _____ 5. The "kissing" muscle	E. Orbicularis oris
<input type="radio"/> _____ 6. Prime mover of jaw closure	F. Sternocleidomastoid
<input type="radio"/> _____ 7. Synergist muscle for jaw closure	G. Temporalis
<input type="radio"/> _____ 8. Prime mover of head flexion; a two-headed muscle	H. Trapezius
	I. Zygomaticus

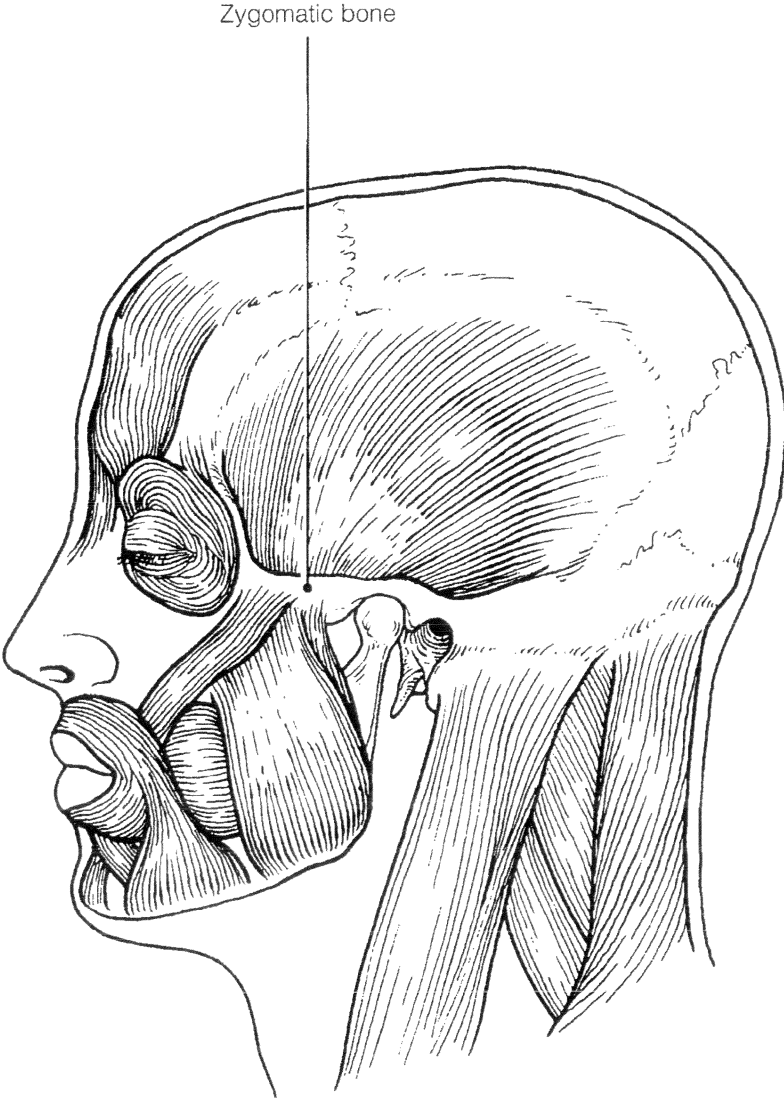


Figure 6-6

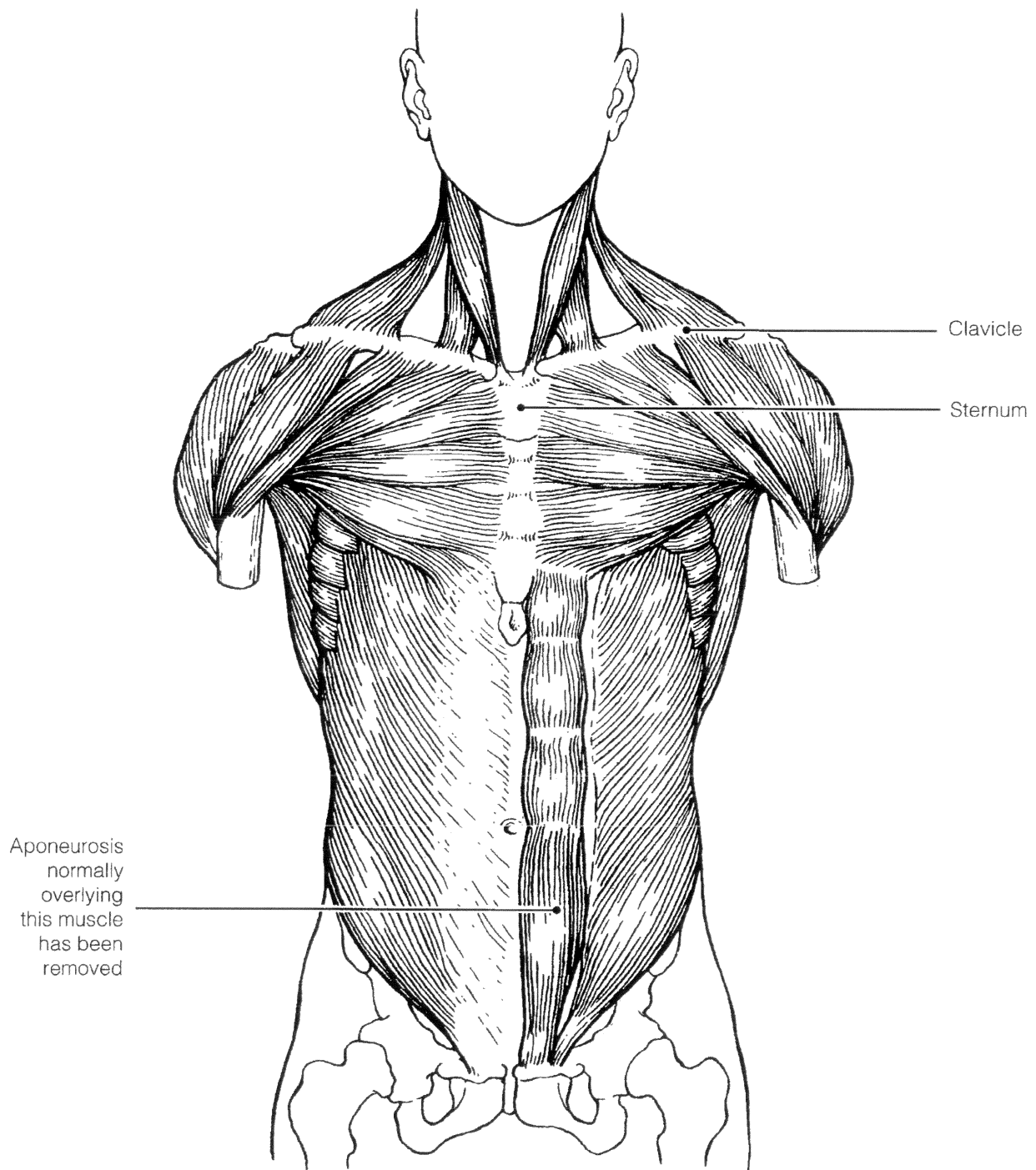


Figure 6-7

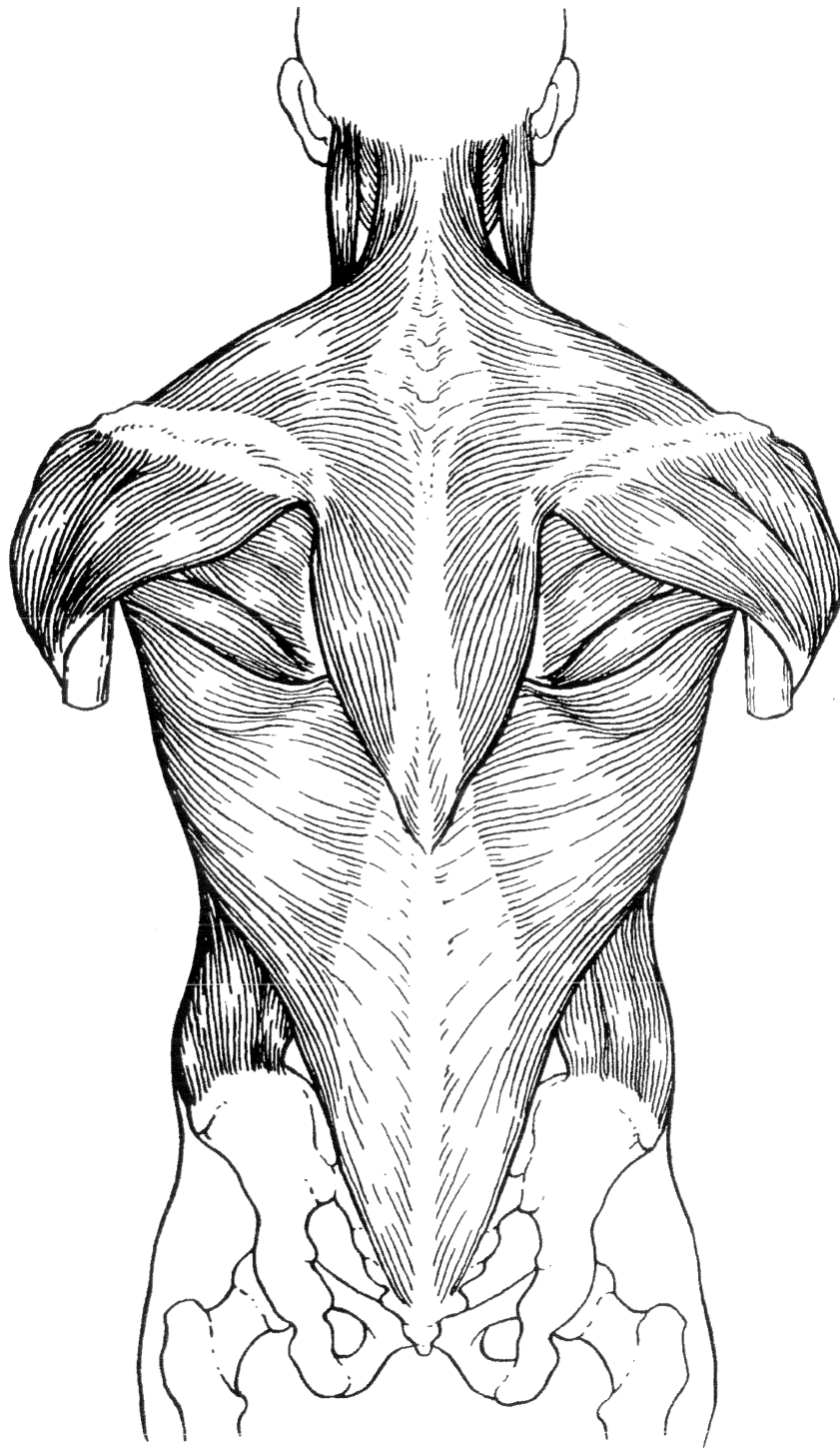


Figure 6-8

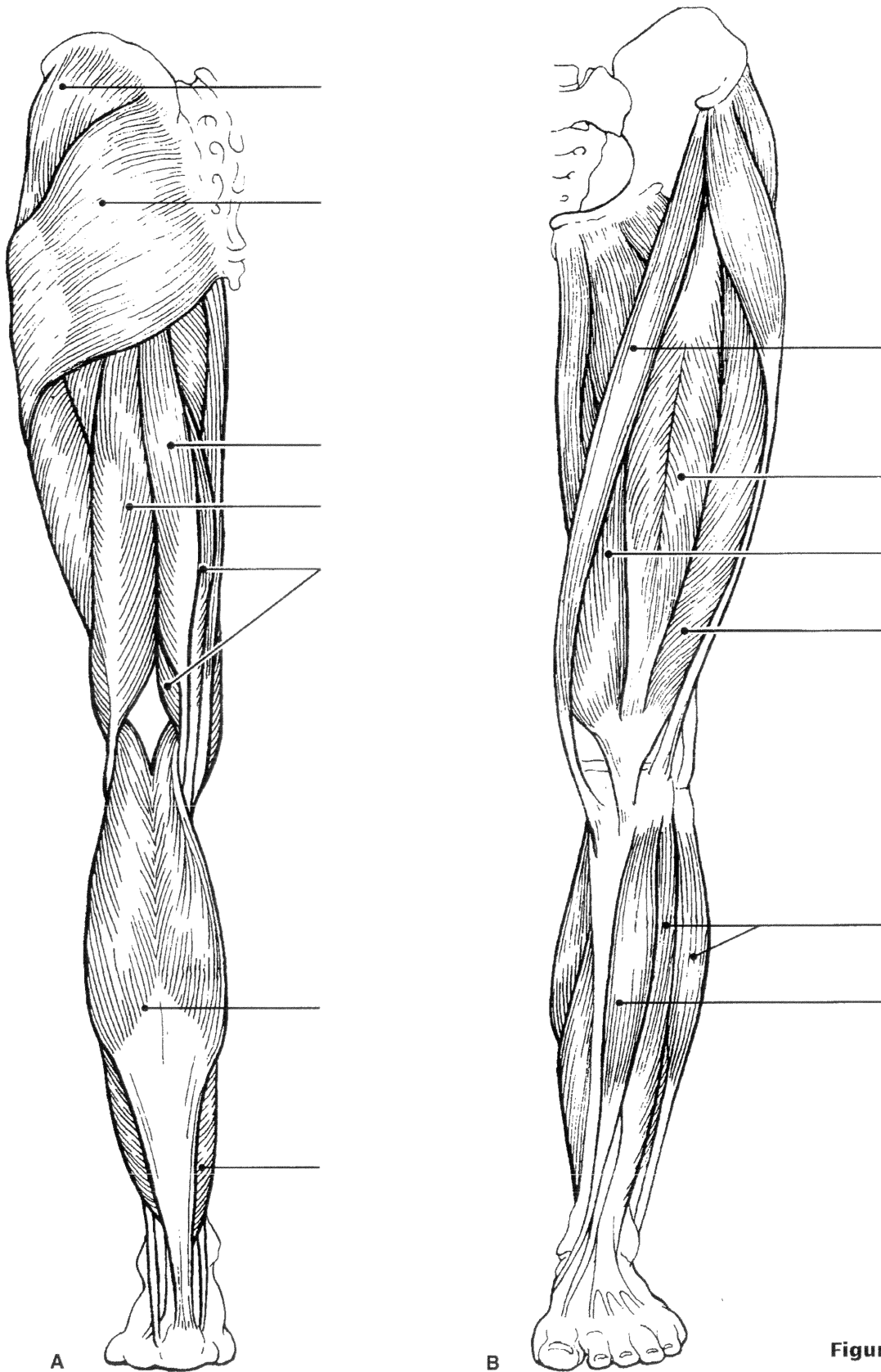


Figure 6-9



25. Identify the numbered muscles in Figure 6–11 by placing the numbers in the blanks next to the following muscle names. Then select a different color for each muscle provided with a color-coding circle and color the coding circle and corresponding muscle in Figure 6–11.

- \_\_\_\_\_ 1. Orbicularis oris
- \_\_\_\_\_ 2. Pectoralis major
- \_\_\_\_\_ 3. External oblique
- \_\_\_\_\_ 4. Sternocleidomastoid
- \_\_\_\_\_ 5. Biceps brachii
- \_\_\_\_\_ 6. Deltoid
- \_\_\_\_\_ 7. Vastus lateralis
- \_\_\_\_\_ 8. Frontalis
- \_\_\_\_\_ 9. Rectus femoris
- \_\_\_\_\_ 10. Sartorius
- \_\_\_\_\_ 11. Gracilis
- \_\_\_\_\_ 12. Adductor group
- \_\_\_\_\_ 13. Fibularis longus
- \_\_\_\_\_ 14. Temporalis
- \_\_\_\_\_ 15. Orbicularis oculi
- \_\_\_\_\_ 16. Zygomaticus
- \_\_\_\_\_ 17. Masseter
- \_\_\_\_\_ 18. Vastus medialis
- \_\_\_\_\_ 19. Tibialis anterior
- \_\_\_\_\_ 20. Transversus abdominis
- \_\_\_\_\_ 21. Rectus abdominis

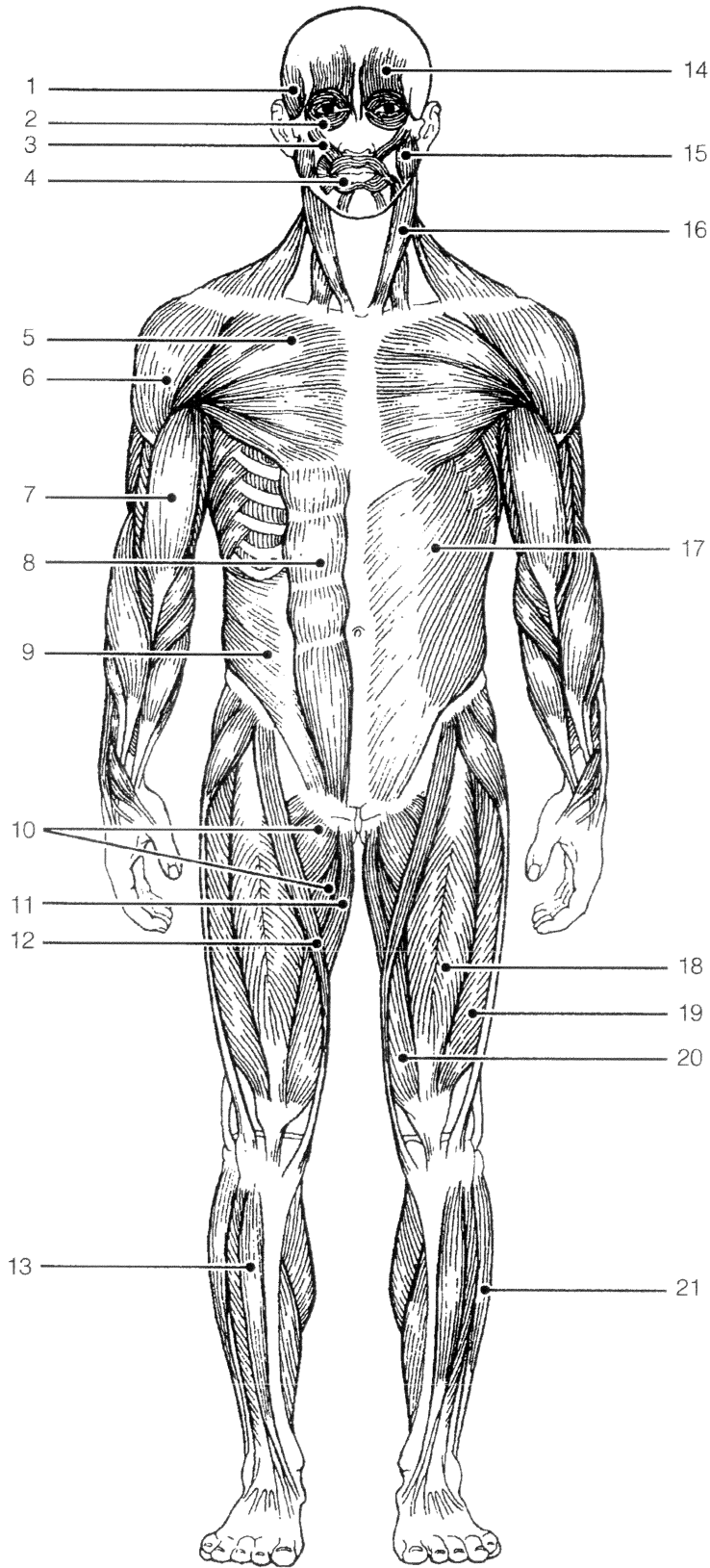


Figure 6-11

26. Identify each of the numbered muscles in Figure 6–12 by placing the numbers in the blanks next to the following muscle names. Then select different colors for each muscle and color the coding circles and corresponding muscles on Figure 6–12.

- \_\_\_\_\_ 1. Adductor muscle
- \_\_\_\_\_ 2. Gluteus maximus
- \_\_\_\_\_ 3. Gastrocnemius
- \_\_\_\_\_ 4. Latissimus dorsi
- \_\_\_\_\_ 5. Deltoid
- \_\_\_\_\_ 6. Semitendinosus
- \_\_\_\_\_ 7. Soleus
- \_\_\_\_\_ 8. Biceps femoris
- \_\_\_\_\_ 9. Triceps brachii
- \_\_\_\_\_ 10. External oblique
- \_\_\_\_\_ 11. Gluteus medius
- \_\_\_\_\_ 12. Trapezius

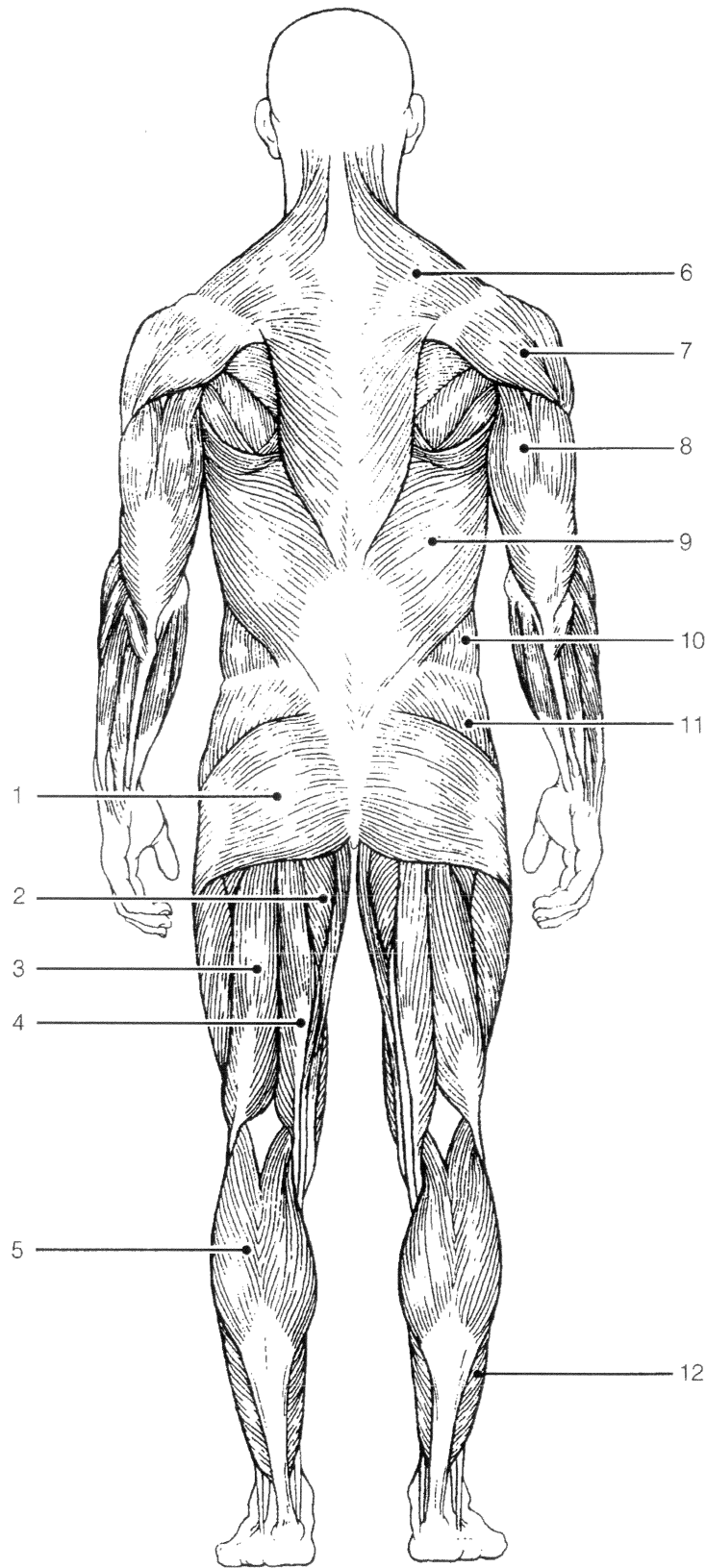


Figure 6-12