

# ANATOMY

## SET 1

**Mrs. Shockley**

Name \_\_\_\_\_

Anatomy and Physiology students,

This is a packet has been put together for Ch. 6 ( Muscular System) The first page is your usual assignment sheet that you receive at the beginning of each chapter. The other work is a little different than we are use to, but use your anatomy book as your main resource. I will also upload helpful powerpoints and videos on our google classroom. We normally would do a chicken wing dissection after the learning about the skeletal and muscular system. I didn't want you to completely be left out of the hands on portion of the lab so the next best thing was a virtual lab. I encourage you to complete the virtual lab...I hope you are impressed at what you did learn the first nine weeks and this virtual lab will remind you of a lot of our past concepts. Please take advantage of the learning packets you will be receiving . This information might become very important in your future. Please e-mail me if you have any problems or concerns ([nshockley@dcboe.com](mailto:nshockley@dcboe.com)). Please keep check on your google classroom and e-mail as I will continually post important information. As always, take care and stay safe!

Mrs. Shockley

CHAPTER 6 ASSIGNMENT SHEET  
THE MUSCULAR SYSTEM

1. Aerobic
2. Antagonist
3. Cardiac muscle
4. Endomysium
5. Epimysium
6. Insertion
7. Involuntary
8. Isometric contractions
9. Isotonic contractions
10. Myofibers
11. Myofilaments
12. Origin
13. Oxygen debt
14. Perimysium
15. Prime Mover
16. Resistance
17. Skeletal Muscles
18. Smooth Muscle
19. Striated
20. Voluntary

\*\*Read Chapter 6 as each section is discussed in class

\*\*Record four interesting facts "A Closer Look" (p203)

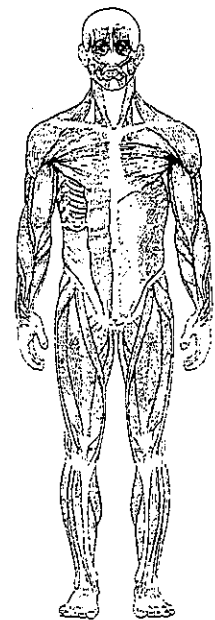
\*\*Record four interesting facts "Focus on Careers" (p220)

\*\*Answer Review Questions # 3,4,5 (p224) \*\* Write letter and answer\*\*

\*\*Answer Short Answer Essay #9,10,13,16,18,28,29 (p225)

\*\*Answer At The Clinic #31,32 (pp.226)

# 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 muscles contribute to body contours and shape. These muscles allow you to grin, run, shake hands, 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. Six characteristics of muscle tissue are listed below. 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.

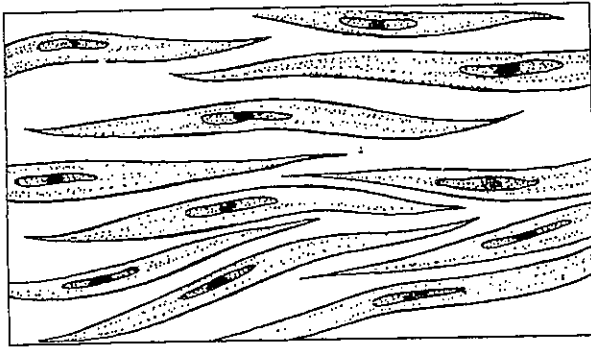
### *Key Choices*

A. Cardiac                      B. Smooth                      C. Skeletal

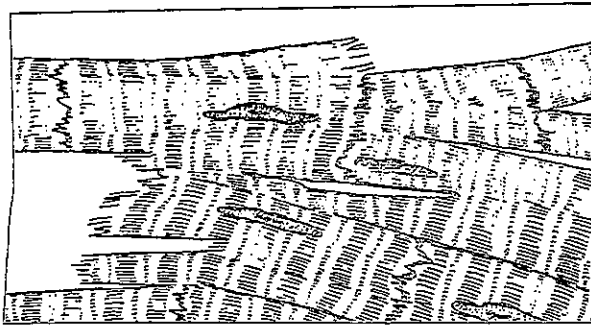
- \_\_\_\_\_ 1. Involuntary
- \_\_\_\_\_ 2. Banded appearance
- \_\_\_\_\_ 3. Dense connective tissue packaging
- \_\_\_\_\_ 4. Coordinated activity to act as a pump
- \_\_\_\_\_ 5. Moves bones and the facial skin
- \_\_\_\_\_ 6. Referred to as the muscular system

2. Identify the type of muscle in each of the illustrations in Figure 6-1. Select different colors for each structure listed below and use them to color the coding circles and the corresponding structures in the diagrams, when applicable.

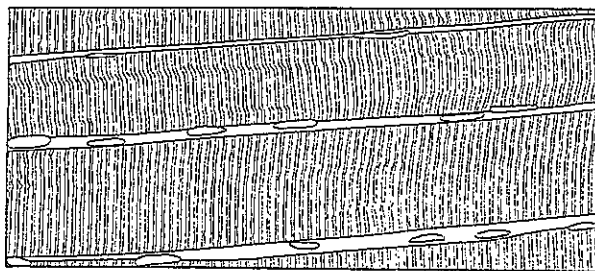
- Nucleus     
  Nucleolus     
  Striations     
  Intercalated discs



A \_\_\_\_\_



B \_\_\_\_\_



C \_\_\_\_\_

Figure 6-1

3. Circle the term that does not belong in each of the following groupings. Then, fill in the answer blanks with the correct group name.

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

## MICROSCOPIC ANATOMY OF SKELETAL MUSCLE

2. 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.

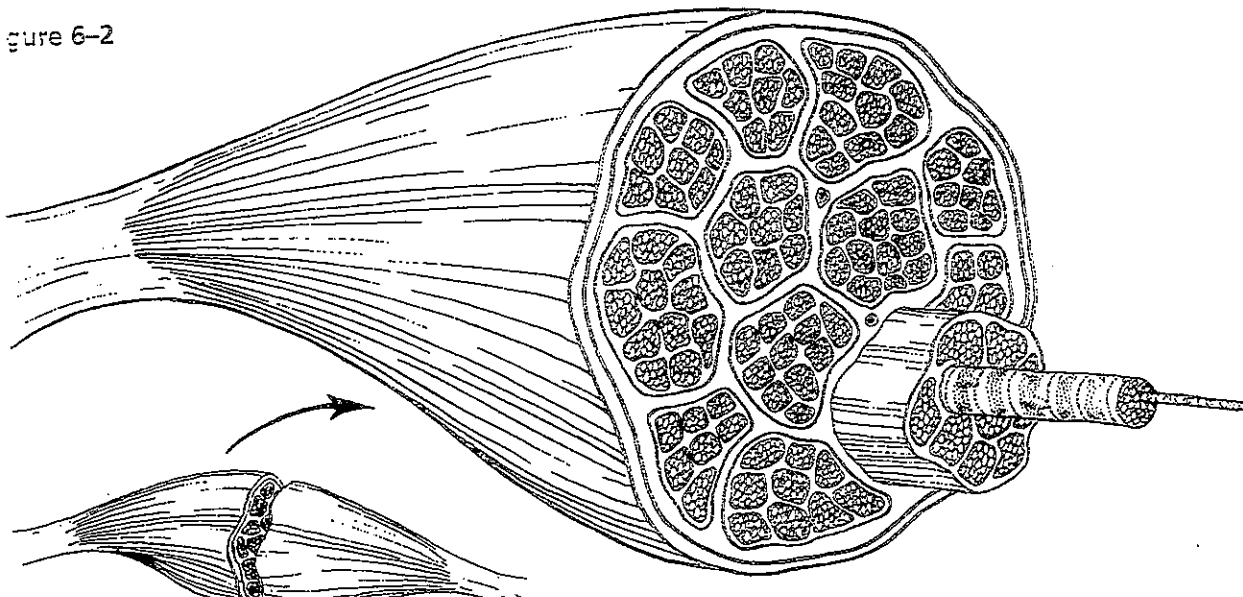
**Column A**

**Column B**

- \_\_\_\_\_ 1. Connective tissue surrounding a fascicle
- \_\_\_\_\_ 2. Connective tissue covering the entire muscle
- \_\_\_\_\_ 3. Contractile unit of muscle
- \_\_\_\_\_ 4. A muscle cell
- \_\_\_\_\_ 5. Thin connective tissue enclosing each muscle cell
- \_\_\_\_\_ 6. Plasma membrane of the muscle cell
- \_\_\_\_\_ 7. A long, filamentous organelle found within muscle cells that has a banded appearance
- \_\_\_\_\_ 8. Actin- or myosin-containing structure
- \_\_\_\_\_ 9. Cordlike extension of connective tissue beyond the muscle, serving to attach it to the bone
- \_\_\_\_\_ 10. A discrete bundle of muscle cells

- A. Endomysium
- B. Epimysium
- C. Fascicle
- D. Fiber
- E. Myofilament
- F. Myofibril
- G. Perimysium
- H. Sarcolemma
- I. Sarcomere
- J. Tendon

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).
- (A) Select different colors for the structures listed below. Use them to color the coding circles and corresponding structures on Figure 6-3.
- (B) Bracket and label an A band, an I band, and a sarcomere.
- (C) 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

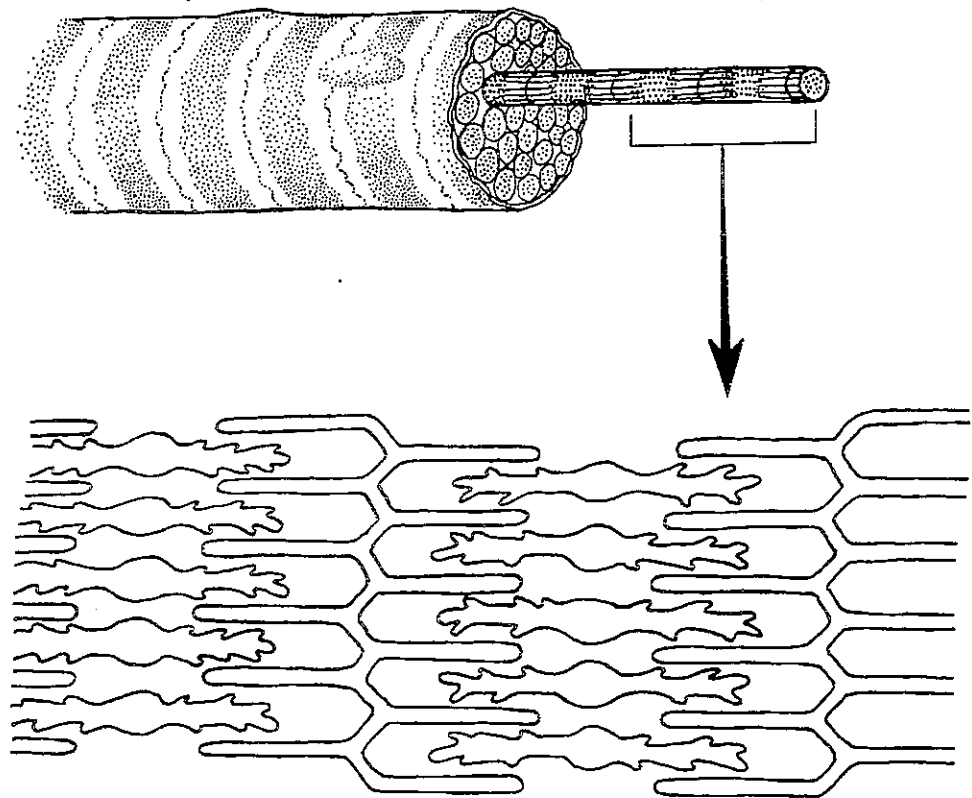


Figure 6-3

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?

## SCHELETAL MUSCLE ACTIVITY

- Complete the following statements relating to the neuromuscular junction. Write the correct answers in the numbered answer blanks.

- \_\_\_\_\_ 1. A motor neuron and all of the skeletal muscle cells it stimulates is called a (1). The axon of each motor neuron
- \_\_\_\_\_ 2. has numerous endings called (2). The actual gap between an axonal ending and the muscle cell is called a (3).
- \_\_\_\_\_ 3. Within the axonal endings are many small vesicles containing a neurotransmitter substance called (4).
- \_\_\_\_\_ 4.
- \_\_\_\_\_ 5. When the (5) reaches the ends of the axon, the neurotransmitter is released, and it diffuses to the muscle cell membrane to combine with receptors there. Binding of the neurotransmitters with muscle membrane receptors causes the membrane to become permeable to sodium, resulting in the influx of sodium ions and (6) of the membrane. Then contraction of the muscle cell occurs.
- \_\_\_\_\_ 6.

- Figure 6-4 shows the components of a neuromuscular junction.
- A Identify the parts by coloring the coding circles and the corresponding structures in the diagram.
  - B Add small arrows to indicate the location of the acetylcholine (ACh) receptors and label appropriately.

- |  |   |   |
|--|---|---|
| <input type="checkbox"/> Mitochondrion     | <input type="checkbox"/> T tubule       | <input type="checkbox"/> Sarcomere        |
| <input type="checkbox"/> Synaptic vesicles | <input type="checkbox"/> Synaptic cleft | <input type="checkbox"/> Junctional folds |

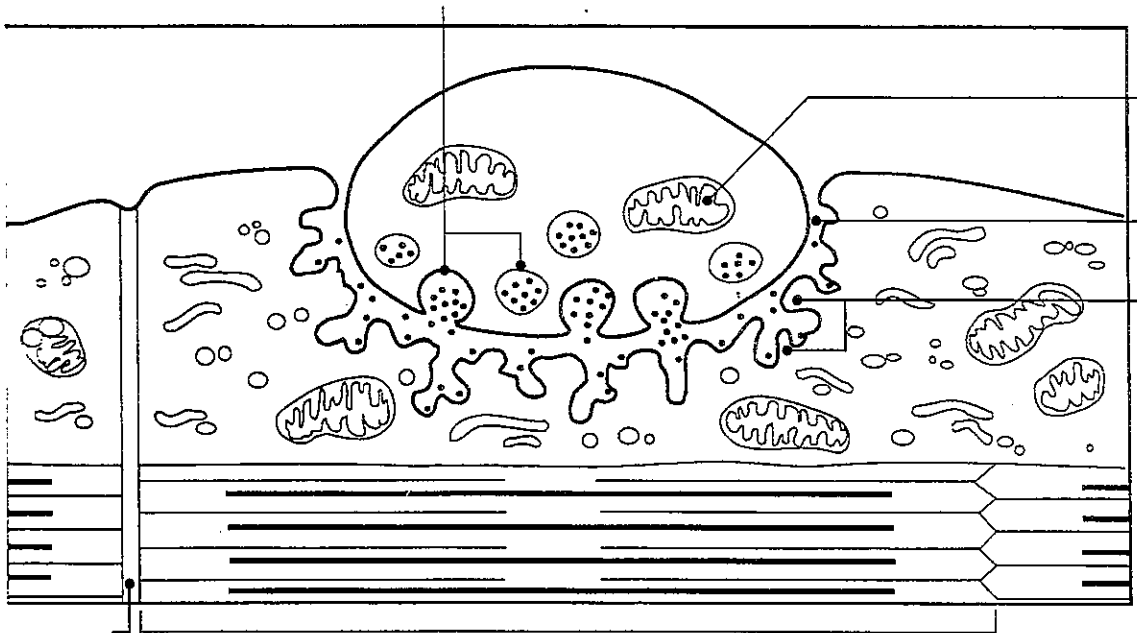


Figure 6-4





Complete the following statements by choosing the correct response from the key choices and entering the appropriate letter or term in the answer blanks.

*Key Choices*

- |                         |                          |                     |
|-------------------------|--------------------------|---------------------|
| A. Fatigue              | E. Isometric contraction | I. Many motor units |
| B. Isotonic contraction | F. Whole muscle          | J. Repolarization   |
| C. Muscle cell          | G. Fused tetanus         | K. Depolarization   |
| D. Muscle tone          | H. Few motor units       | L. Unfused tetanus  |

- \_\_\_\_\_ 1. \_\_\_\_\_ is a continuous contraction that shows no evidence of relaxation.
- \_\_\_\_\_ 2. A(n) \_\_\_\_\_ is a contraction in which the muscle shortens and work is done.
- \_\_\_\_\_ 3. To accomplish a strong contraction, \_\_\_\_\_ are stimulated at a rapid rate.
- \_\_\_\_\_ 4. When a weak but smooth muscle contraction is desired, \_\_\_\_\_ are stimulated at a rapid rate.
- \_\_\_\_\_ 5. When a muscle is being stimulated but is not able to respond because of "oxygen deficit," the condition is called \_\_\_\_\_.
- \_\_\_\_\_ 6. A(n) \_\_\_\_\_ is a contraction in which the muscle does not shorten, but tension in the muscle keeps increasing.

The terms in the key choices refer to the three ways that muscle cells replenish their ATP supplies. Select the term(s) that best apply to the conditions described and insert the correct key letter(s) in the answer blanks. Items may have more than one answer.

*Key Choices*

- |  |                        |
|--|------------------------|
| A. Coupled reaction of creatine phosphate (CP) and ADP | C. Aerobic respiration |
| B. Anaerobic glycolysis                                |                        |

- \_\_\_\_\_ 1. Accompanied by lactic acid formation
- \_\_\_\_\_ 2. Supplies the highest ATP yield per glucose molecule
- \_\_\_\_\_ 3. Involves the simple transfer of a phosphate group
- \_\_\_\_\_ 4. Requires no oxygen
- \_\_\_\_\_ 5. The slowest ATP regeneration process
- \_\_\_\_\_ 6. Produces carbon dioxide and water
- \_\_\_\_\_ 7. The energy mechanism used in the second hour of running in a marathon
- \_\_\_\_\_ 8. Used when the oxygen supply is inadequate over time
- \_\_\_\_\_ 9. Good for a sprint

12. Briefly describe how you can tell when you are repaying the oxygen deficit.

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13. Which of the following occur within a muscle cell during oxygen deficit? Place a check (✓) by the correct choices.

- |       |                          |       |                             |
|-------|--------------------------|-------|-----------------------------|
| _____ | 1. Decreased ATP         | _____ | 5. Increased oxygen         |
| _____ | 2. Increased ATP         | _____ | 6. Decreased carbon dioxide |
| _____ | 3. Increased lactic acid | _____ | 7. Increased carbon dioxide |
| _____ | 4. Decreased oxygen      | _____ | 8. Increased glucose        |

### MUSCLE MOVEMENTS, TYPES, AND NAMES

14. Relative to general terminology concerning muscle activity, label the following structures on Figure 6-5: insertion, origin, tendon, resting muscle, and contracting muscle. Then, identify the two structures named below by choosing different colors for the coding circles and the corresponding structures in the figure.

- Movable bone
- Immovable bone

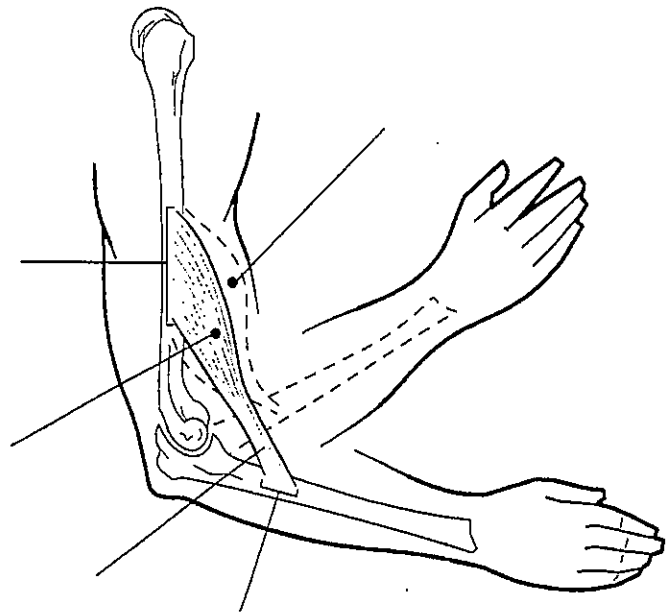


Figure 6-5

15. Complete the following statements. Insert your answers in the answer blanks.

- \_\_\_\_\_ 1. Standing on your toes as in ballet is (1) of the foot. Walking on your heels is (2).
- \_\_\_\_\_ 2. \_\_\_\_\_
- \_\_\_\_\_ 3. Winding up for a pitch (as in baseball) can properly be called (3). To keep your seat when riding a horse, the tendency is to (4) your thighs.
- \_\_\_\_\_ 4. \_\_\_\_\_
- \_\_\_\_\_ 5. In running, the action at the hip joint is (5) in reference to the leg moving forward and (6) in reference to the leg in the posterior position. When kicking a football, the action at the knee is (7). In climbing stairs, the hip and knee of the forward leg are both (8). You have just touched your chin to your chest; this is (9) of the neck.
- \_\_\_\_\_ 6. \_\_\_\_\_
- \_\_\_\_\_ 7. \_\_\_\_\_
- \_\_\_\_\_ 8. Using a screwdriver with a straight arm requires (10) of the arm. Consider all the movements of which the arm is capable.
- \_\_\_\_\_ 9. One often used for strengthening all the upper arm and shoulder muscles is (11).
- \_\_\_\_\_ 10. \_\_\_\_\_
- \_\_\_\_\_ 11. Moving the head to signify "no" is (12). Action that moves the distal end of the radius across the ulna is (13). Raising the arms laterally away from the body is called (14) of the arms.
- \_\_\_\_\_ 12. \_\_\_\_\_
- \_\_\_\_\_ 13. \_\_\_\_\_
- \_\_\_\_\_ 14. \_\_\_\_\_

16. The terms provided in the key choices are often used to describe the manner in which muscles interact with other muscles. Select the key terms that apply to the following definitions and insert the correct letter or term in the answer blanks.

### Key Choices

A. Antagonist      B. Fixator      C. Prime mover      D. Synergist

- \_\_\_\_\_ 1. Agonist
- \_\_\_\_\_ 2. Postural muscles for the most part
- \_\_\_\_\_ 3. Stabilizes a joint so that the prime mover can act at more distal joints
- \_\_\_\_\_ 4. Performs the same movement as the prime mover
- \_\_\_\_\_ 5. Reverses and/or opposes the action of a prime mover
- \_\_\_\_\_ 6. Immobilizes the origin of a prime mover

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. Items may have more than one answer.

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
○ _____ 1. Used to show you're happy	A. Buccinator
○ _____ 2. Used to suck in your cheeks	B. Frontalis
○ _____ 3. Used in winking	C. Masseter
○ _____ 4. Wrinkles the forehead horizontally	D. Orbicularis oculi
○ _____ 5. The "kissing" muscle	E. Orbicularis oris
○ _____ 6. Prime mover of jaw closure	F. Sternocleidomastoid
○ _____ 7. Synergist muscle for jaw closure	G. Temporalis
○ _____ 8. Prime mover of head flexion; a two-headed muscle	H. Trapezius
	I. Zygomaticus

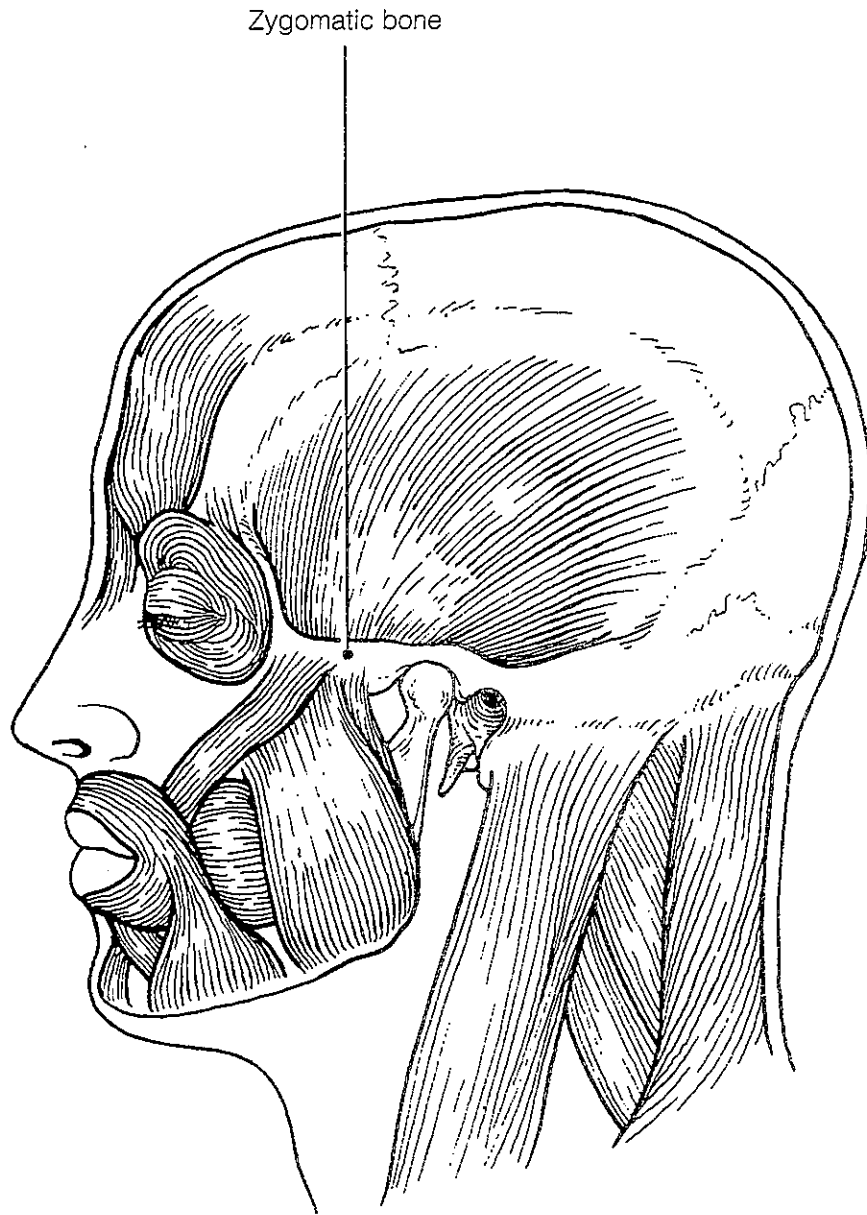


Figure 6-6

19. Match the muscle names in Column B to the facial muscles described in Column A.

Column A		Column B
_____	1. Squints the eyes	A. Buccinator
_____	2. Pulls the eyebrows superiorly	B. Frontal belly of the epicranium
_____	3. Smiling muscle	C. Occipital belly of the epicranium
_____	4. Puckers the lips	D. Orbicularis oculi
_____	5. Draws the corners of the lips downward	E. Orbicularis oris
_____	6. Pulls the scalp posteriorly	F. Platysma
		G. Zygomaticus

## Muscles of the Trunk

20. Identify the anterior trunk muscles described in Column A by choosing a response from Column B. Enter the correct letter in the answer blank. Then, for each muscle description that has a color-coding circle, select a different color to color the coding circle and corresponding muscle on Figure 6-7.

Column A		Column B
○ _____	1. Means "straight muscle of the abdomen"	A. Deltoid
○ _____	2. Prime mover for shoulder flexion and adduction	B. Diaphragm
○ _____	3. Prime mover for shoulder abduction	C. External intercostal
○ _____	4. Part of the abdominal girdle; forms the external lateral walls of the abdomen	D. External oblique
○ _____	5. Acting alone, each muscle of this pair turns the head toward the opposite shoulder	E. Internal intercostal
_____	6. and 7. Besides the two abdominal muscles (pairs) named above, two muscle pairs that help form the natural abdominal girdle	F. Internal oblique
_____	8. Deep muscles of the thorax that promote the inspiratory phase of breathing	G. Latissimus dorsi
_____	9. An unpaired muscle; acts with the muscles named immediately above to accomplish inspiration	H. Pectoralis major
		I. Rectus abdominis
		J. Sternocleidomastoid
		K. Transversus abdominis

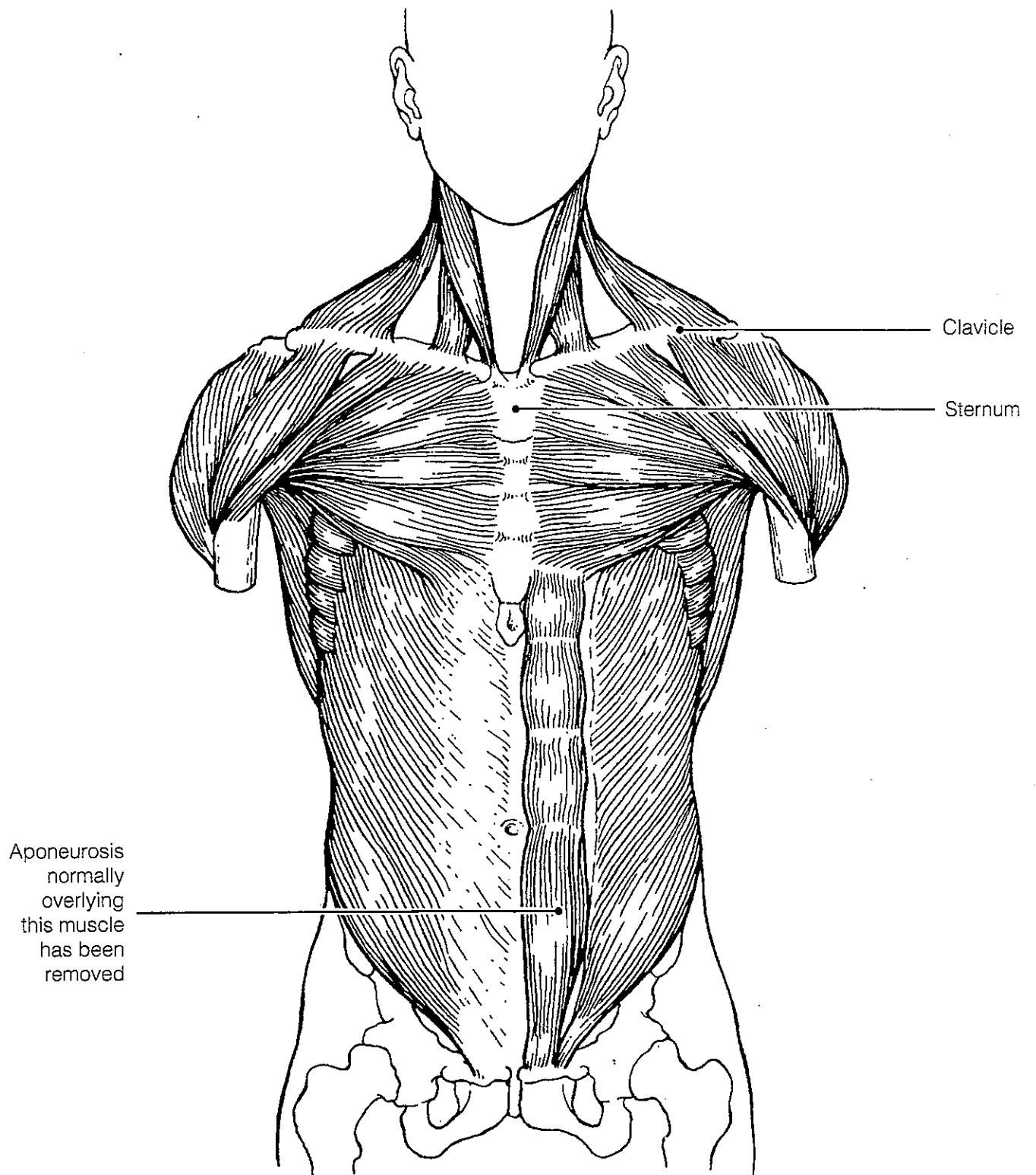


Figure 6-7



21. Identify the posterior trunk 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 description with a coding circle and color the coding circles and corresponding muscles on Figure 6–8.

Column A		Column B
○ _____	1. Muscle that allows you to shrug your shoulders or extend your head	A. Deltoid
○ _____	2. Muscle that adducts the shoulder and causes extension of the shoulder joint	B. Erector spinae
○ _____	3. Shoulder muscle that is the antagonist of the muscle just described	C. External oblique
_____	4. Prime mover of back extension; a deep composite muscle consisting of three columns	D. Gluteus maximus
_____	5. Large paired superficial muscle of the lower back	E. Latissimus dorsi
○ _____	6. Fleshy muscle forming part of the posterior abdominal wall that helps maintain upright posture	F. Quadratus lumborum
		G. Trapezius

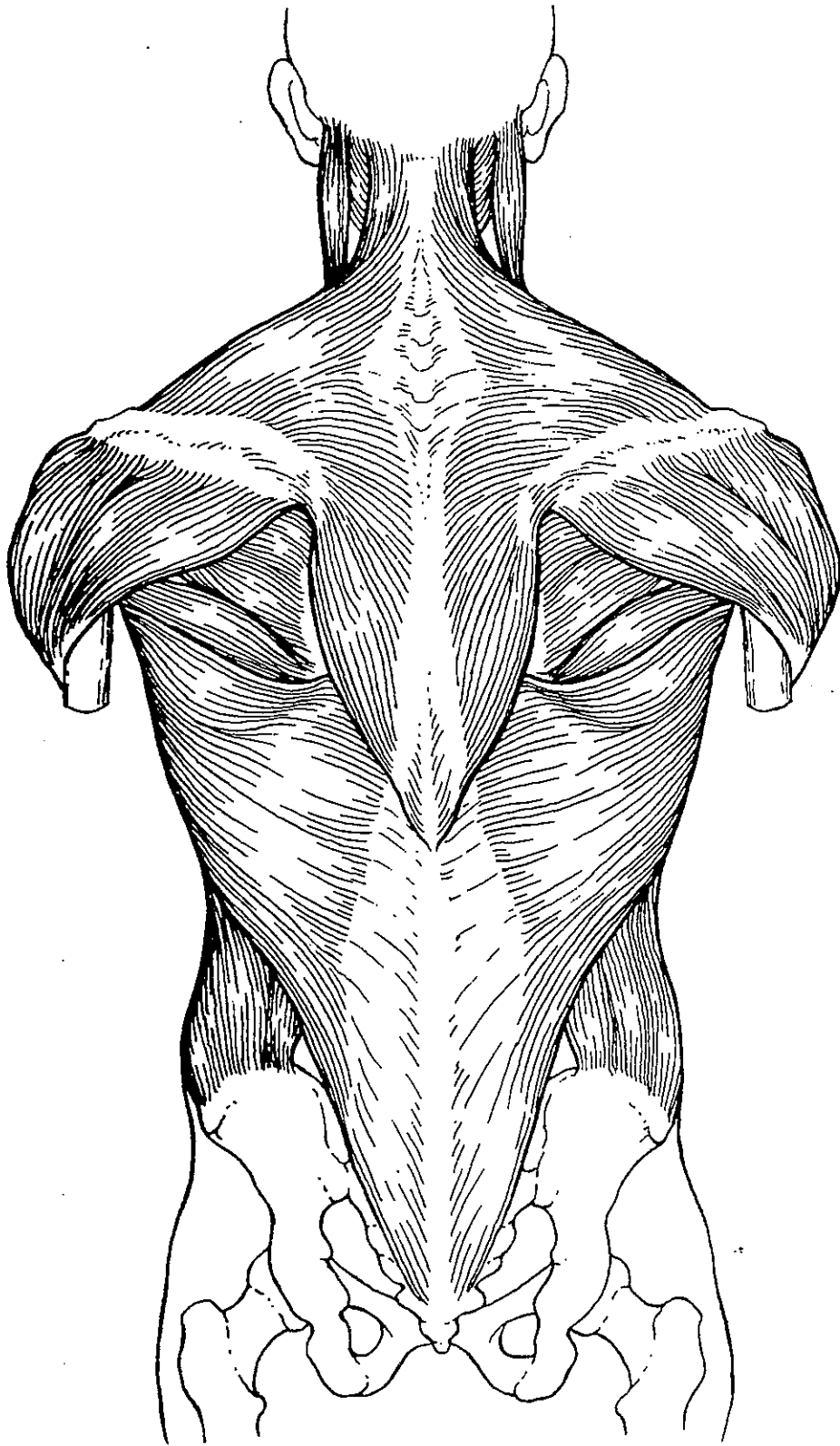


Figure 6-8

## Muscles of the Hip, Thigh, and Leg

22. Identify the 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 description provided with a color-coding circle, and use it to color the coding circles and corresponding muscles on Figure 6–9. Complete the illustration by labeling those muscles provided with leader lines.

### Column A

- \_\_\_\_\_ 1. Hip flexor, deep in pelvis; a composite of two muscles
- \_\_\_\_\_ 2. Used to extend the hip when climbing stairs
- \_\_\_\_\_ 3. “Toe dancer’s” muscle; a two-bellied muscle of the calf
- \_\_\_\_\_ 4. Inverts and dorsiflexes the foot
- \_\_\_\_\_ 5. Muscle group that allows you to draw your legs to the midline of your body, as when standing at attention
- \_\_\_\_\_ 6. Muscle group that extends the knee
- \_\_\_\_\_ 7. Muscle group that extends the thigh and flexes the knee
- \_\_\_\_\_ 8. Smaller hip muscle commonly used as an injection site
- \_\_\_\_\_ 9. Muscle group of the lateral leg; plantar flex and evert the foot
- \_\_\_\_\_ 10. Straplike muscle that is a weak thigh flexor; the “tailor’s muscle”
- \_\_\_\_\_ 11. Like the two-bellied muscle that lies over it, this muscle is a plantar flexor

### Column B

- A. Adductors
- B. Biceps femoris
- C. Fibularis muscles
- D. Gastrocnemius
- E. Gluteus maximus
- F. Gluteus medius
- G. Hamstrings
- H. Iliopsoas
- I. Quadriceps
- J. Rectus femoris
- K. Sartorius
- L. Semimembranosus
- M. Semitendinosus
- N. Soleus
- O. Tibialis anterior
- P. Vastus intermedius
- Q. Vastus lateralis
- R. Vastus medialis

23. What is the functional reason the muscle group on the dorsal leg (calf) is so much larger than the muscle group in the ventral leg region?

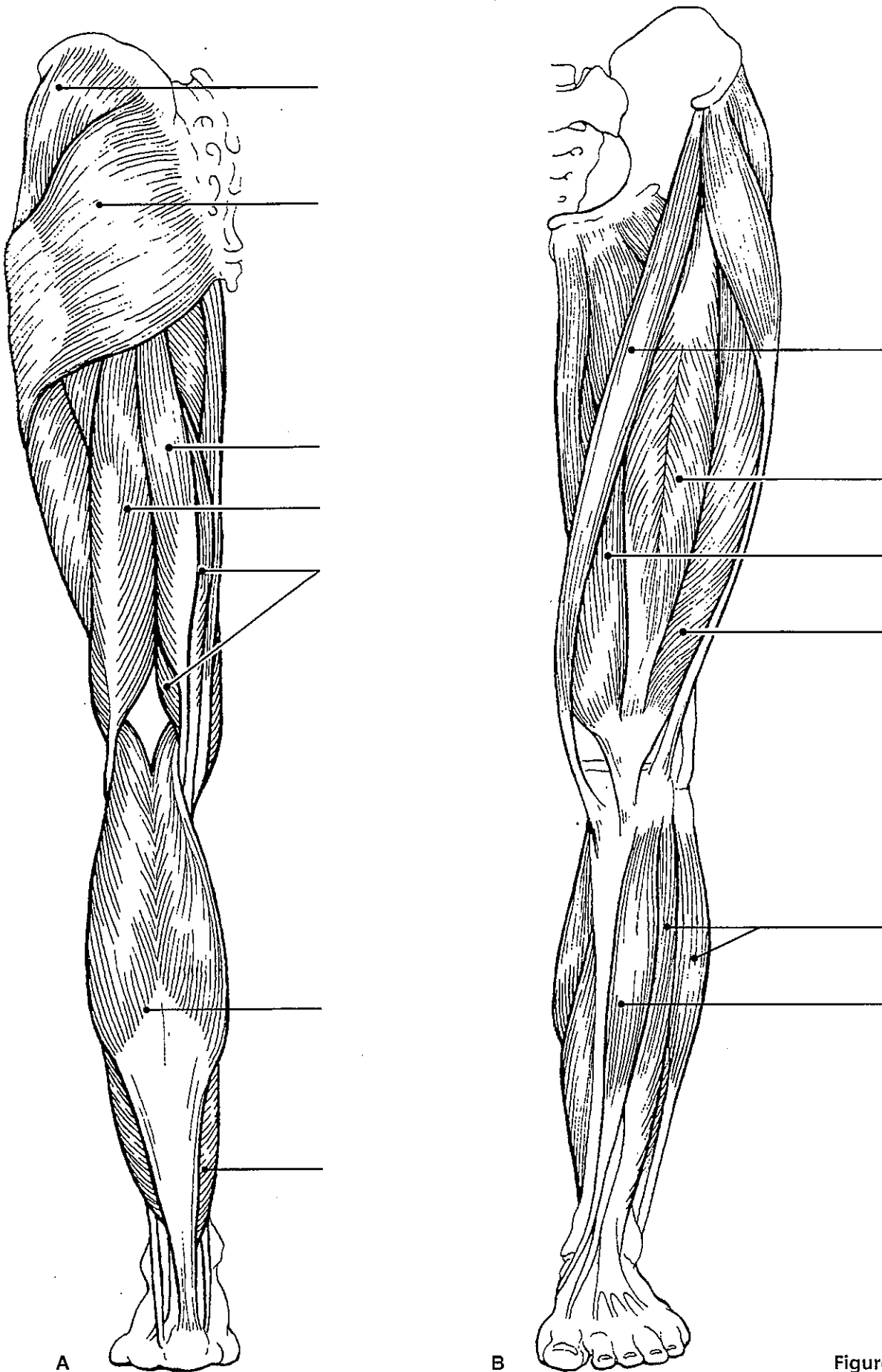


Figure 6-9

## Muscles of the Arm and Forearm

24. Identify the muscles described in Column A by choosing a response from Column B. Enter the correct letter in the answer blank. Select different colors for each muscle description provided with a color-coding circle and use them to color in the coding circles and corresponding muscles on Figure 6–10.

### Column A

- \_\_\_\_ 1. Wrist flexor that follows the ulna
- \_\_\_\_ 2. Muscle that extends the fingers
- \_\_\_\_ 3. Muscle that flexes the fingers
- \_\_\_\_ 4. Muscle that allows you to bend (flex) the elbow
- \_\_\_\_ 5. Muscle that extends the elbow
- \_\_\_\_ 6. Powerful shoulder abductor, used to raise the arm overhead

### Column B

- A. Biceps brachii
- B. Deltoid
- C. Extensor carpi radialis
- D. Extensor digitorum
- E. Flexor carpi ulnaris
- F. Flexor digitorum superficialis
- G. Triceps brachii

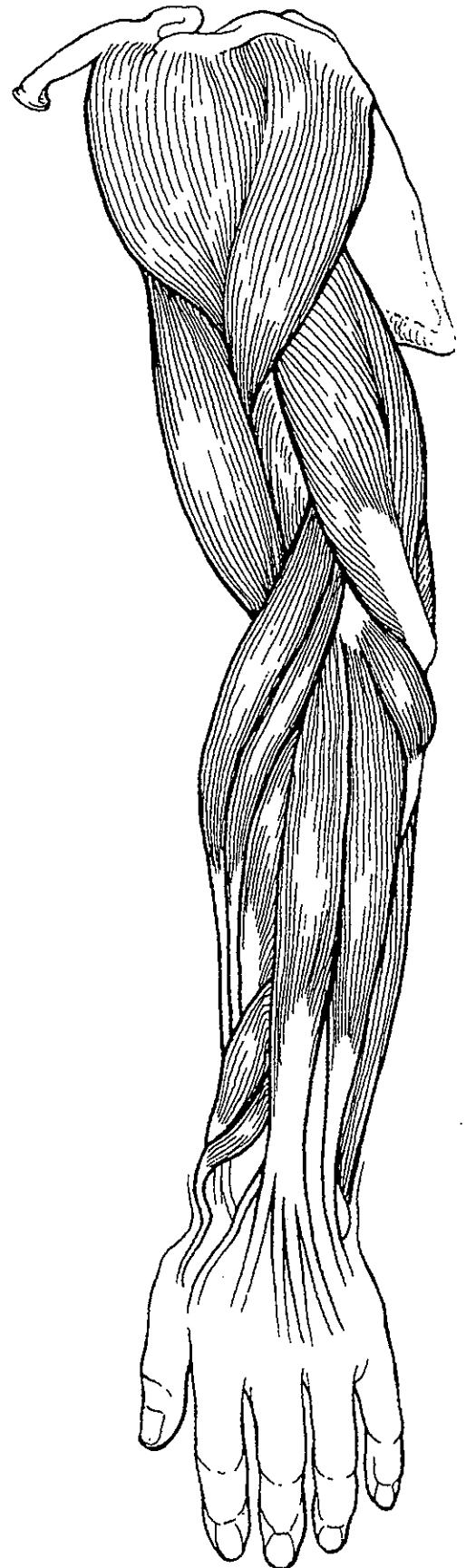


Figure 6–10

## General Body Muscle Review

25. Using the key choices, complete the crossword puzzle by answering each of the clues provided.

### Key Choices

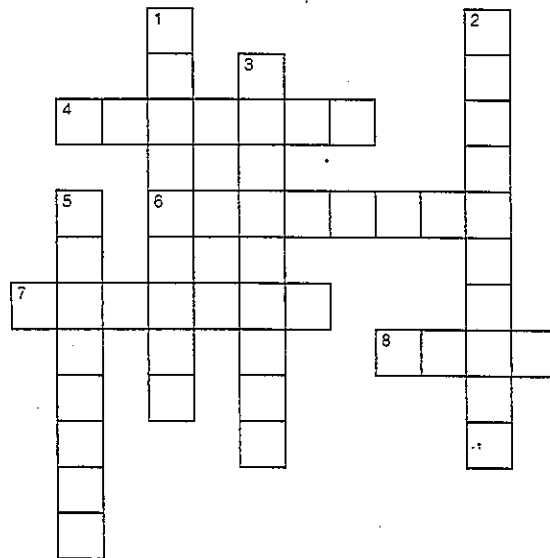
Anterior	Distal	Forearm	Proximal
Calcaneal	Elbow	Knee	Quadriceps
Deltoid	Flex	Posterior	

### Across

- Three muscles, the gluteus maximus, gluteus medius, and \_\_\_\_\_, are commonly used for intramuscular injections in adults.
- Most flexor muscles are located on the \_\_\_\_\_ aspect of the body.
- The extrinsic muscles of the hand originate on the \_\_\_\_\_.
- The pectoralis major and deltoid muscles act synergistically to \_\_\_\_\_ the arm.

### Down

- The triceps surae (gastrocnemius and soleus) insert in common into the \_\_\_\_\_ tendon.
- The insertion tendon of the \_\_\_\_\_ group contains a large sesamoid bone, the patella.
- Most extensors are located on the \_\_\_\_\_ aspect of the body.
- The bulk of the tissue of a muscle tends to lie \_\_\_\_\_ to the part of the body it causes to move.



26. Circle the term that does not belong in each of the following groupings. Then, fill in the answer blanks with the correct group name.

1. *Vastus lateralis*    *Vastus medialis*    *Knee extension*    *Biceps femoris*    **Group:** \_\_\_\_\_

2. *Latissimus dorsi*    *Pectoralis major*    *Adduction*    *Antagonists*    **Group:** \_\_\_\_\_

3. *Buccinator*    *Frontalis*    *Masseter*    *Temporalis*    **Group:** \_\_\_\_\_

27. When kicking a football, at least three major actions of the lower limb are involved. Name the major muscles (or muscle groups) responsible for the following:

1. Flexing the hip joint: \_\_\_\_\_
2. Extending the knee: \_\_\_\_\_
3. Dorsiflexing the foot: \_\_\_\_\_

28. Identify the numbered muscles in Figure 6-11 by placing the numbers in the blanks next to the following muscle names. 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

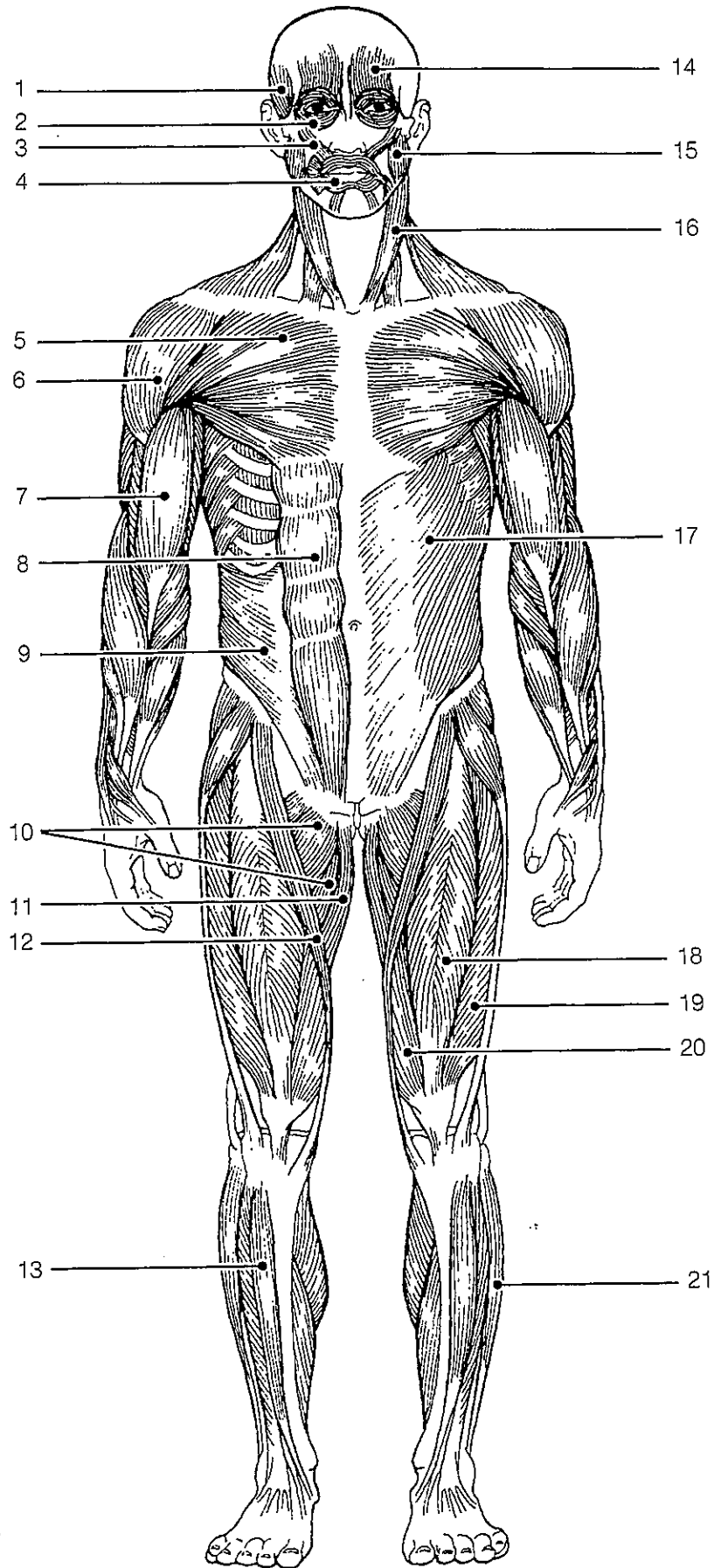


Figure 6-11



29. Identify each of the numbered muscles in Figure 6-12 by placing the numbers in the blanks next to the following muscle names. 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

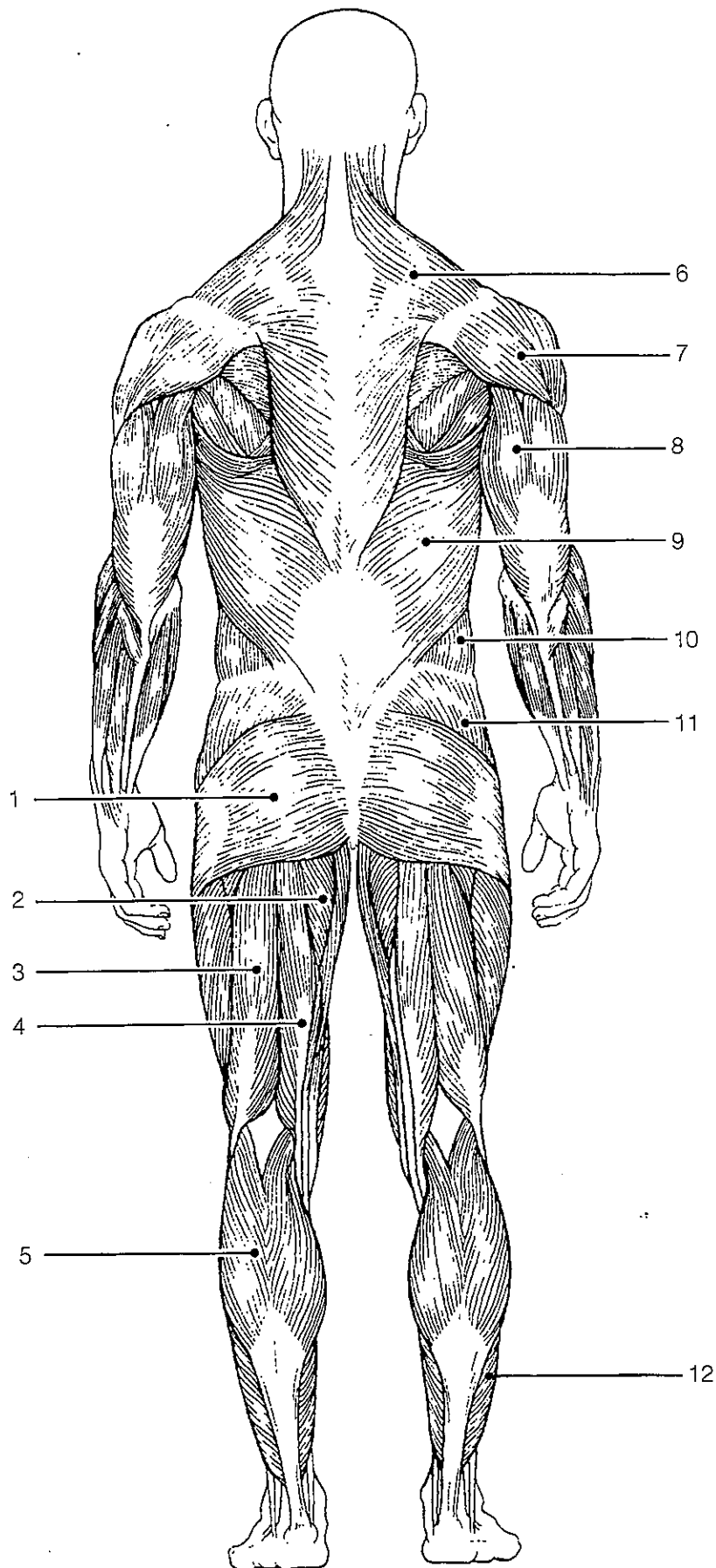


Figure 6-12

Name: \_\_\_\_\_ Block: \_\_\_\_\_ Date: \_\_\_\_\_

## Virtual Musculoskeletal System Exploration: Chicken Wing

### Background:

Skeletal muscles are attached to bones, give shape to the body, generate heat, and make movement possible. Skeletal muscles cannot function without the bones of the skeletal system. Muscles pull on bones in specific ways and with the guidance of ligaments allow joints to flex or extend in a specific direction. The skeletal system is a network of various living tissues which provide protection for organs and give the human body its structure. It is also the site of blood cell formation. Chicken wings are homologous to the upper limb of humans; that is, they have many of the same structures due to their shared evolutionary history as vertebrates. We can therefore study a chicken wing to help us relate the structure of muscles, bones, and joints to their function.

### Directions:

1. Watch this video: <http://www.youtube.com/watch?v=i0pRhej45kg>
2. Read and watch this animation: \_\_\_\_\_
3. Answer the following questions. You may use other sources on the internet if necessary.

### Questions:

1. What is the very first step in dissecting the chicken wing? \_\_\_\_\_
2. What happens when you pull on the triceps muscle? \_\_\_\_\_
3. What is an extensor? \_\_\_\_\_
4. What happens when you pull on the biceps muscle? \_\_\_\_\_
5. What is a flexor? \_\_\_\_\_
6. What type of tissue makes up the "meat" of a chicken? \_\_\_\_\_
7. What is the function of ligaments? \_\_\_\_\_
8. What is the function of tendons? \_\_\_\_\_
9. What is the function of the cartilage found at a joint? \_\_\_\_\_  
\_\_\_\_\_
10. There is a yellowish tissue clumped together beneath the skin of the chicken wing. This is fat tissue, made of fat cells. What are two functions of this fat? \_\_\_\_\_  
\_\_\_\_\_
11. Based on your observations, EXPLAIN how and why muscles work in "opposing pairs" to move bones. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

12. Complete the following with the diagram of the chicken wing on the back of this page.
- Label the following bones in the diagram: carpals, humerus, metacarpals, phalanges, radius, ulna
  - Draw the biceps muscle where it is correctly attached (to bones) with the tendon. Draw the tendon in gray, the muscle in red. Label the biceps muscle.
  - Draw the triceps muscle where it is correctly attached (to bones) with the tendon. Draw the tendon in gray, the muscle in red. Label the triceps muscle.
  - Label (with an arrow) the direction the radius and ulna move when the triceps contract.
  - Muscles attach in two locations. The attachment end that moves a bone is called the INSERTION. The attachment end that stays stationary, anchoring the muscle, is called the ORIGIN. Label the origin and insertion of the BICEPS muscle.

