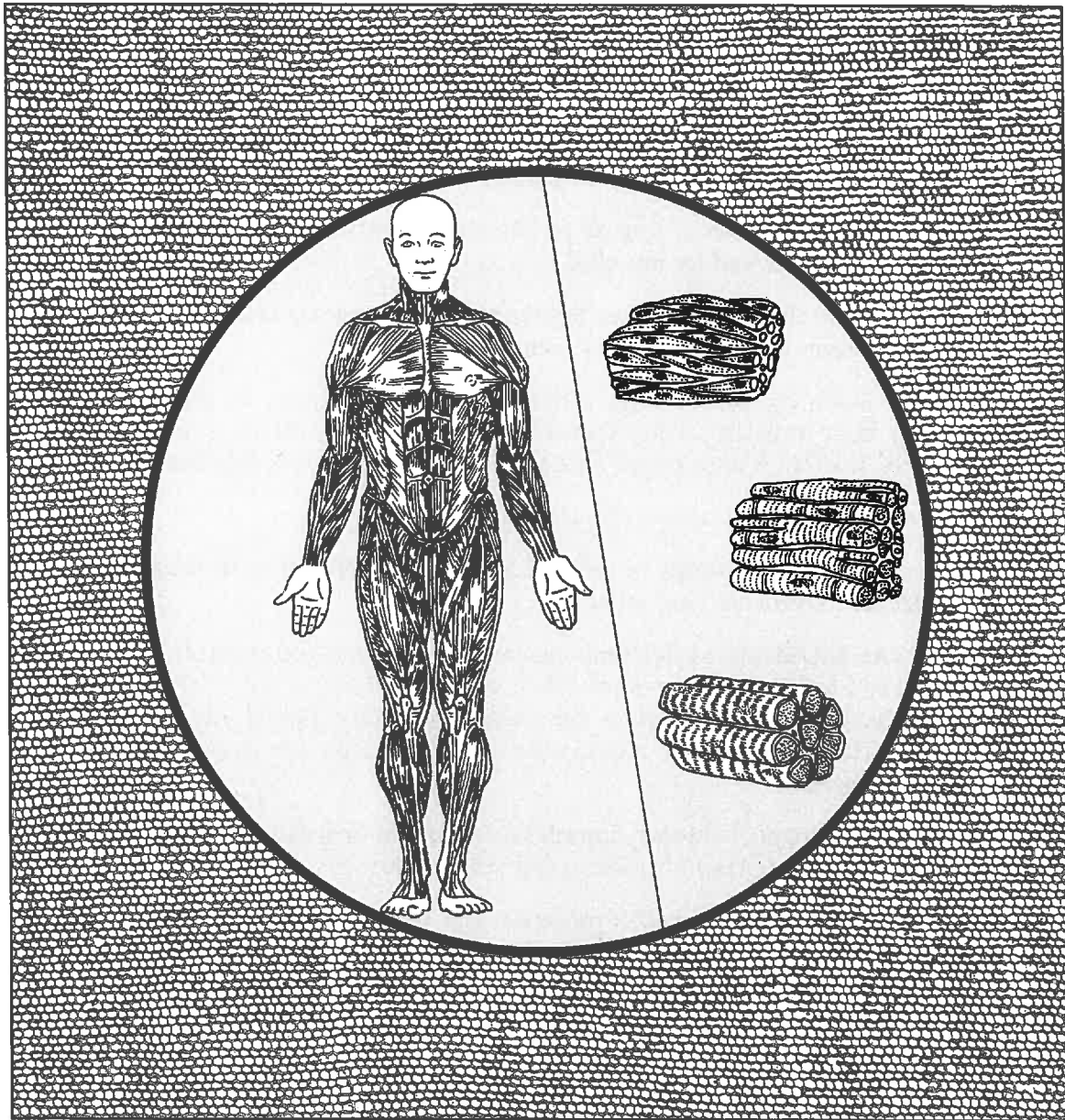


# What is the muscular system?

4



**cardiac** [KAHR-dee-ak] **muscle:** type of muscle found only in the heart  
**skeletal muscle:** muscle attached to the skeleton, making movement possible  
**smooth muscle:** muscle that causes movements that you cannot control

# LESSON

## 4

# What is the muscular system?

You are always moving. You walk, you talk, you write, and chew. You swallow and blink, and also wink.

You breathe day and night. Your heart is always beating. Every moment, materials within your cells are "on the go." Movement stops only when life stops.

Movement within cells is caused by chemical reactions. All other body movements are caused by muscles.

You have more than 600 muscles. Some are large. Some are small. Muscles make up nearly half of your body weight.

Muscles work by contracting. When a muscle contracts, it shortens. Without your muscles, your bones could not move. When a muscle contracts, it PULLS on a bone. This pulling action produces movement.

Muscles can only pull bones. Muscles cannot push bones.

There are three main kinds of muscle: **skeletal muscle**, **smooth muscle**, and **cardiac** [KAHR-dee-ak] **muscle**.

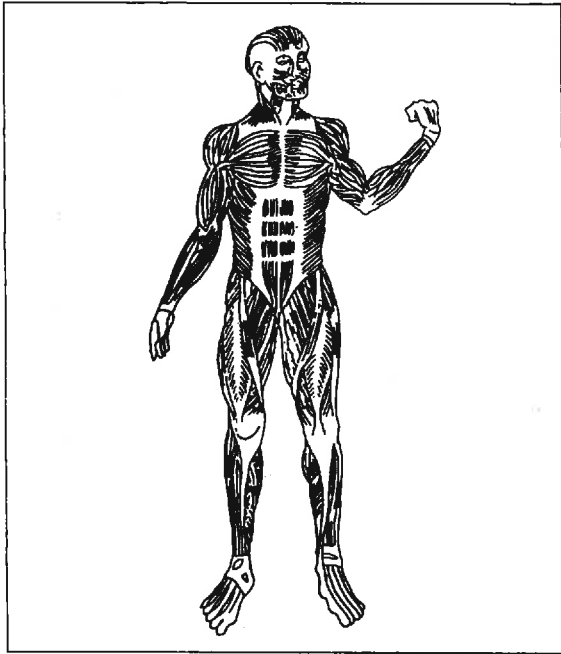
**SKELETAL MUSCLE** Skeletal muscles are muscles that you control. They are attached to bones. They move when you want them to move. For this reason, skeletal muscles often are called voluntary [VAHL-un-ter-ee] muscles. The muscles that move your arms and legs are examples of skeletal muscles.

Under a microscope, voluntary muscles look striped or striated [STRY-ayt-ed]. For this reason, they also are called striated muscles.

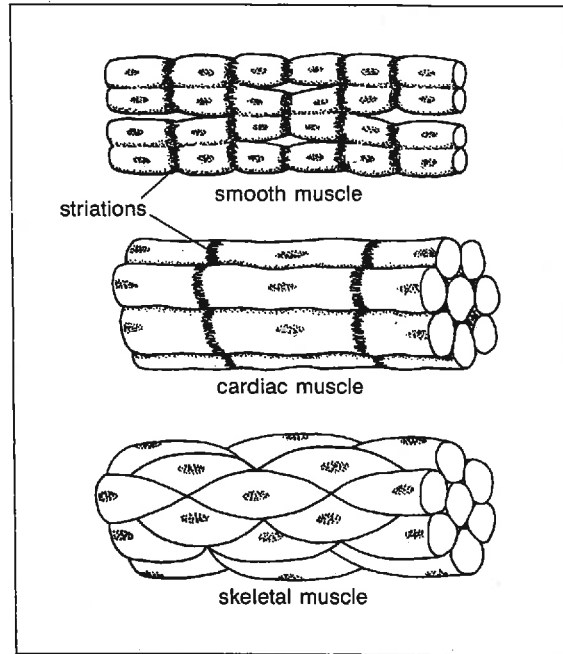
**SMOOTH MUSCLE** Smooth muscles are muscles that you cannot control. They are involuntary muscles. Smooth muscles form the walls of most of the digestive tract. They also are found in blood vessels and other internal organs. How do you think smooth muscles look under a microscope?

**CARDIAC MUSCLE** Cardiac muscle is heart muscle. Under a microscope, cardiac muscle appears striated like voluntary muscles. But, cardiac muscle is involuntary. You have no control over cardiac muscle.

# THE HUMAN MUSCULAR SYSTEM



**Figure A**



**Figure B**

Answer these questions about the human muscular system.

1. About how many muscles does a person have? \_\_\_\_\_
2. Name the three main types of muscle. \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_
3. Muscles that we control are called \_\_\_\_\_ muscles.
4. Muscles we cannot control are called \_\_\_\_\_ muscles.
5. "Cardiac" means \_\_\_\_\_.
6. Cardiac muscle is \_\_\_\_\_.  
voluntary, involuntary
7. Which kind of muscles are attached to bones? \_\_\_\_\_.  
voluntary, involuntary
8. Under a microscope,
  - a) voluntary muscles and cardiac muscle look \_\_\_\_\_.  
smooth, striated
  - b) muscles forming the walls of the digestive tract look \_\_\_\_\_.  
smooth, striated
9. What do muscles produce? \_\_\_\_\_
10. Muscles produce movement by \_\_\_\_\_ bones.  
pushing, pulling

## MORE ABOUT MUSCLES

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Skeletal muscles work in pairs. One muscle straightens a bone at a joint. The other muscle bends the joint.

For example:

- The contracted muscle **PULLS**. This causes movement.
- While the contracted muscle pulls, the other muscle **RELAXES**.

It must! Otherwise, there would be no movement.

Let us work with two actual examples. Study Figures C and D. Then answer the questions.

Figure C shows some of the muscles of the arm. The muscles that bend and straighten the arm are good examples of muscles working together.

1. Name the paired muscles that bend the elbow. \_\_\_\_\_  
\_\_\_\_\_

Now, think carefully about these questions.

2. To bend the arm,
  - a) which muscle must contract?  
\_\_\_\_\_
  - b) which muscle must relax?  
\_\_\_\_\_

3. To straighten the arm,
  - a) which muscle must contract?  
\_\_\_\_\_
  - b) which muscle must relax?  
\_\_\_\_\_

4. Most skeletal muscles are attached to bones by means of special "go-between" tissue. It is strong and elastic. What is the name of this tissue? \_\_\_\_\_

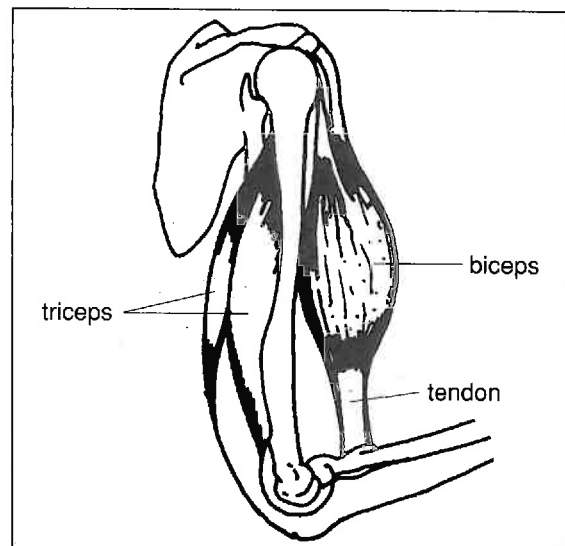


Figure C

Figure D shows some of the muscles of the leg.

5. Write the common names of the muscles that move the ankle.  
 \_\_\_\_\_

6. To bend the ankle,

a) which muscle must contract?  
 \_\_\_\_\_

b) which muscle must relax?  
 \_\_\_\_\_

7. To straighten the ankle,

a) which muscle must contract?  
 \_\_\_\_\_

b) which muscle must relax? \_\_\_\_\_

8. What kind of muscle is the calf muscle? \_\_\_\_\_  
 skeletal, smooth, cardiac

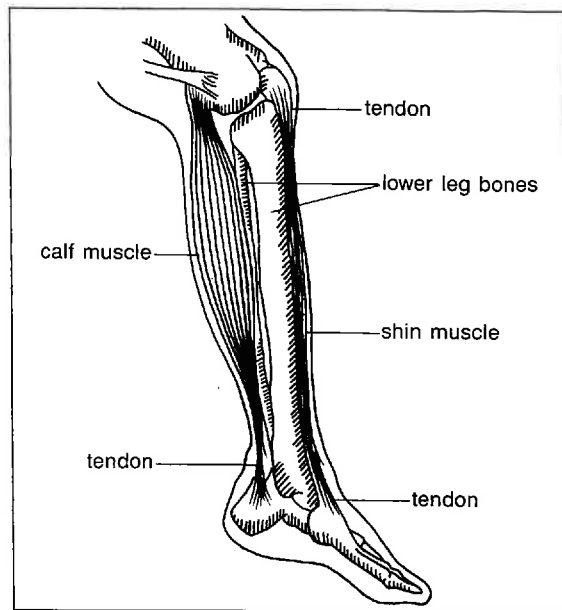


Figure D

### SOME HEALTHY ADVICE

Muscles must be used often to be kept healthy. Regular, moderate exercise—and a good diet—help keep all your muscles in good shape. This includes your heart.



Figure E

## FILL IN THE BLANK

Complete each statement using a term or terms from the list below. Write your answers in the spaces provided.

cardiac ✓  
voluntary ✓  
striated ✓  
relaxes ✓  
tendons ✓

bones ✓  
pull ✓  
muscles ✓  
contracts ✓

push ✓  
smooth ✓  
involuntary ✓  
pairs ✓

1. Body movements are caused by \_\_\_\_\_.
2. Muscles that you can control are called voluntary muscles.
3. Muscles you cannot control are called \_\_\_\_\_ muscles.
4. Voluntary muscles are connected to \_\_\_\_\_.
5. Muscles are connected to bones by \_\_\_\_\_.
6. Skeletal and \_\_\_\_\_ muscle looks \_\_\_\_\_ under a microscope.
7. Under a microscope, digestive muscles look \_\_\_\_\_.
8. Muscles can only \_\_\_\_\_ bones; they cannot \_\_\_\_\_ bones.
9. Skeletal muscles act in \_\_\_\_\_.
10. When one skeletal muscle \_\_\_\_\_, its partner muscle \_\_\_\_\_.

## MATCHING

Match each term in Column A with its description in Column B. Write the correct letter in the space provided.

### Column A

- \_\_\_\_\_ 1. cardiac muscle  
\_\_\_\_\_ 2. smooth muscle  
\_\_\_\_\_ 3. skeletal muscle  
\_\_\_\_\_ 4. striated  
\_\_\_\_\_ 5. tendons

### Column B

- ~~a)~~ voluntary muscle  
~~b)~~ found in blood vessels  
~~c)~~ striped  
~~d)~~ heart muscle  
e) connect skeletal muscle to bones