

**SECTION 15-3**

**SECTION SUMMARY**

# The Muscular System

**Guide for Reading**

- ◆ What three types of muscles are found in the body?
- ◆ Why do muscles work in pairs?

There are about 600 muscles in your body. The muscles that are not under your conscious control are called **involuntary muscles**. Involuntary muscles are responsible for activities such as breathing and digesting food. The muscles that are under your control are called **voluntary muscles**. Smiling and turning the pages in a book are actions of voluntary muscles.

Your body has three types of muscle tissue—**skeletal muscle, smooth muscle, and cardiac muscle**. **Skeletal muscles** are attached to the bones of your skeleton. Because you have conscious control of skeletal muscles, they are classified as voluntary muscles. These muscles provide the force that moves your bones. Skeletal muscles react quickly and tire quickly. At the end of a skeletal muscle is a **tendon**. A **tendon** is a strong connective tissue that attaches muscle to bone. **Smooth muscles** are called involuntary muscles because they work automatically. They are inside many internal organs of the body, and control many types of movements inside your body, such as those involved in the process of digestion. Smooth muscles react more slowly and tire more slowly than skeletal muscles. **Cardiac muscles** are involuntary muscles found only in the heart. Cardiac muscles do not get tired.

Muscles work by contracting, or becoming shorter and thicker. **Because muscle cells can only contract, not extend, skeletal muscles must work in pairs. While one muscle contracts, the other muscle in the pair returns to its original length.** For example, in order to move the lower arm, the biceps muscle on the front of the upper arm contracts to bend the elbow. This lifts the forearm and hand. As the biceps contracts, the triceps on the back of the upper arm returns to its original length. To straighten the elbow, the triceps muscle contracts while the biceps returns to its original length.

Exercise is important for maintaining both muscular strength and flexibility. Exercise makes individual muscle cells grow wider, thicker, and stronger. Some of the same precautions that help prevent bone and joint injuries, such as warming up and using proper safety equipment, can also help prevent muscle injuries.

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**SECTION 15-3 REVIEW AND REINFORCE**

**The Muscular System**

**◆ Understanding Main Ideas**

Complete the table below to describe the characteristics of each type of muscle. Write yes or no next to each number.

Muscle Types	Voluntary	Involuntary	Reacts quickly	Tires quickly
Skeletal	1.	2.	3.	4.
Smooth	5.	6.	7.	8.
Cardiac	9.	10.	11.	12.

Answer the following questions in the spaces provided.

13. Why do skeletal muscles have to work in pairs?

\_\_\_\_\_

\_\_\_\_\_

14. How can you help prevent muscle injuries?

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\_\_\_\_\_

**◆ Building Vocabulary**

Answer the following questions in the spaces provided.

15. What types of actions use smooth muscles? What type of muscle is smooth muscle?

\_\_\_\_\_

\_\_\_\_\_

16. What types of actions use skeletal muscles? What type of muscle is skeletal muscle?

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\_\_\_\_\_

17. How is cardiac muscle similar to both smooth muscle and skeletal muscle?

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