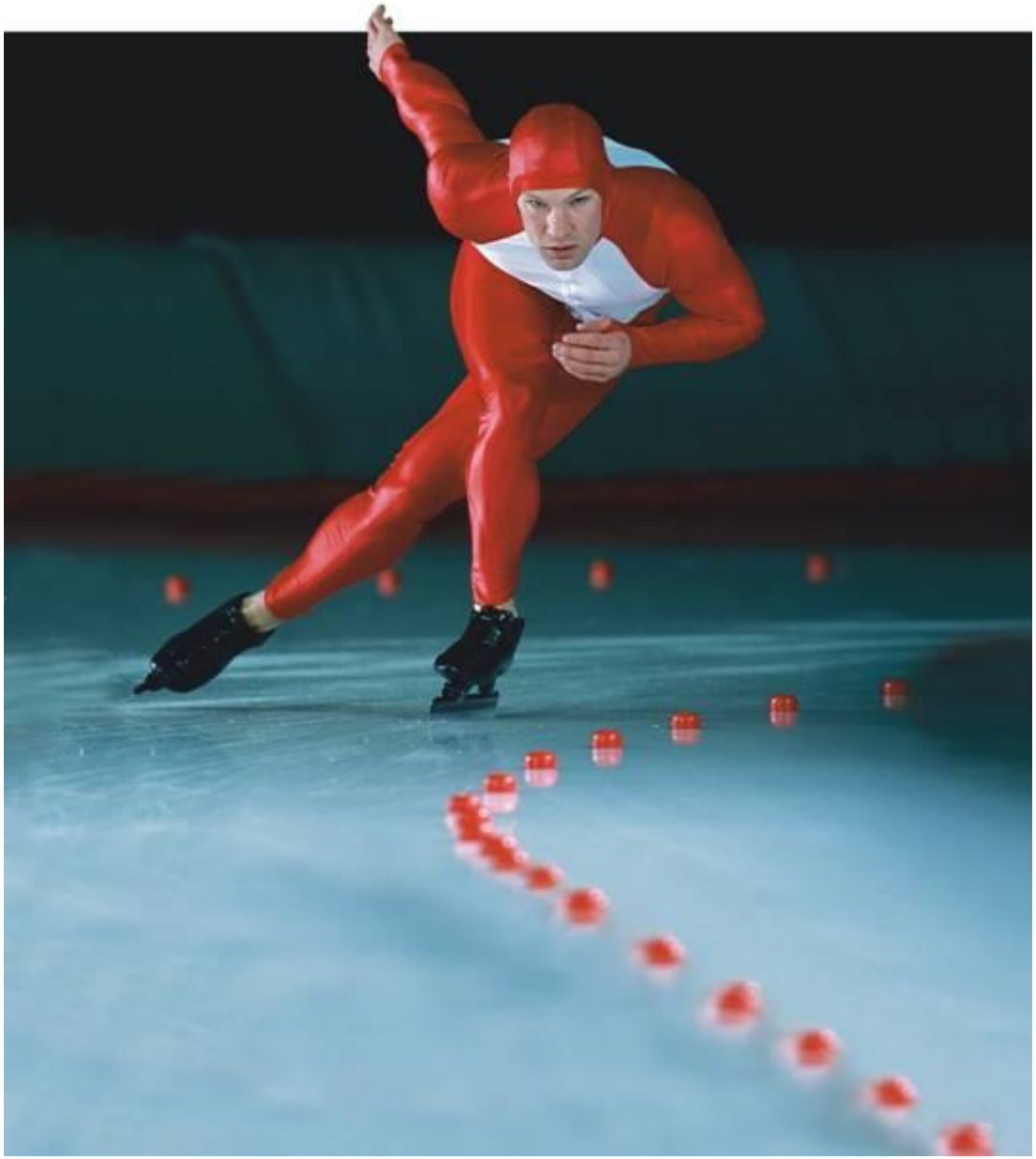
36–2 The Muscular System



There are three different types of muscle tissue:

- **skeletal**
- **smooth**
- **cardiac**

Skeletal Muscles

Skeletal muscles:

- are usually attached to bones.
- are responsible for voluntary movements.
- have many nuclei.
- are sometimes called striated muscles.

Smooth Muscles

Smooth muscles:

- are usually not under voluntary control.
- are spindle-shaped.
- have one nucleus.
- are not striated.
- are found in many internal organs and blood vessels.

Cardiac Muscle

Cardiac muscle:

- is only found in the heart.
- is striated.
- may have one or two nuclei.

Cardiac muscle cells are connected to each other by gap junctions.

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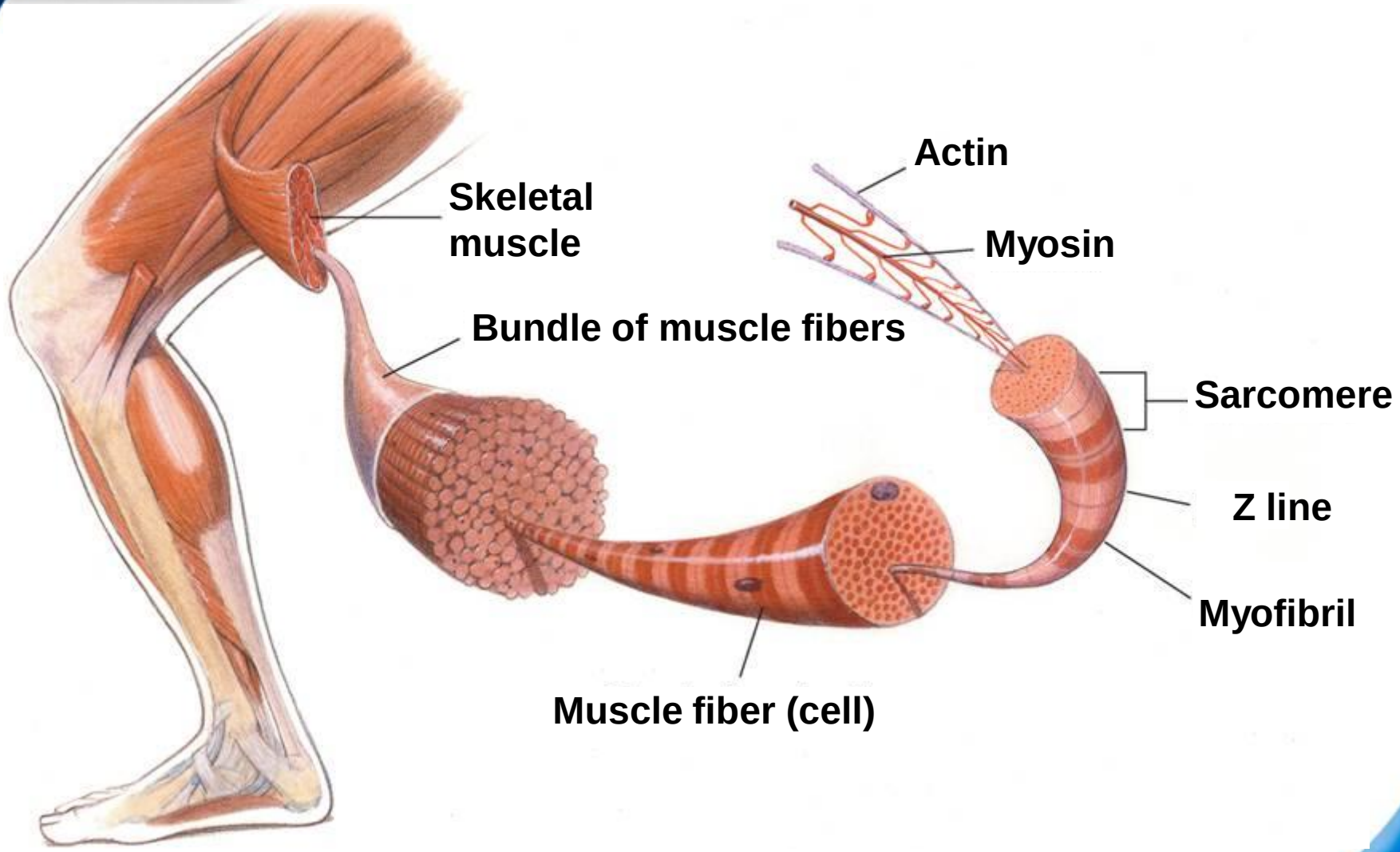
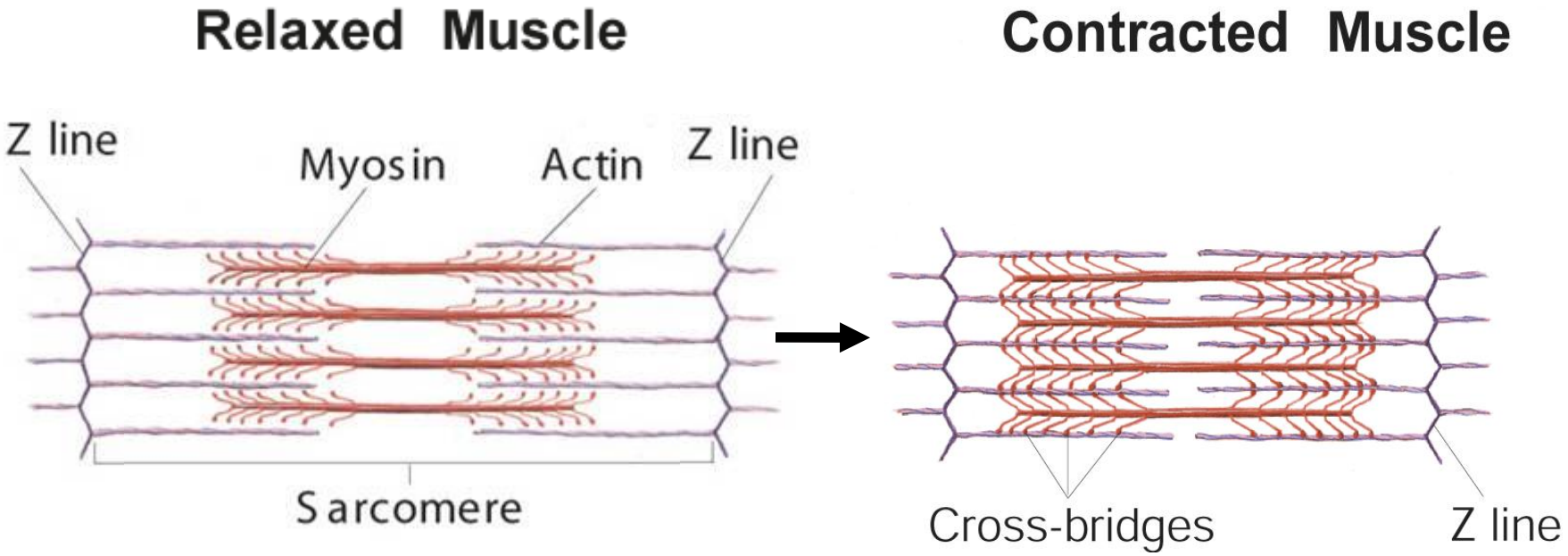


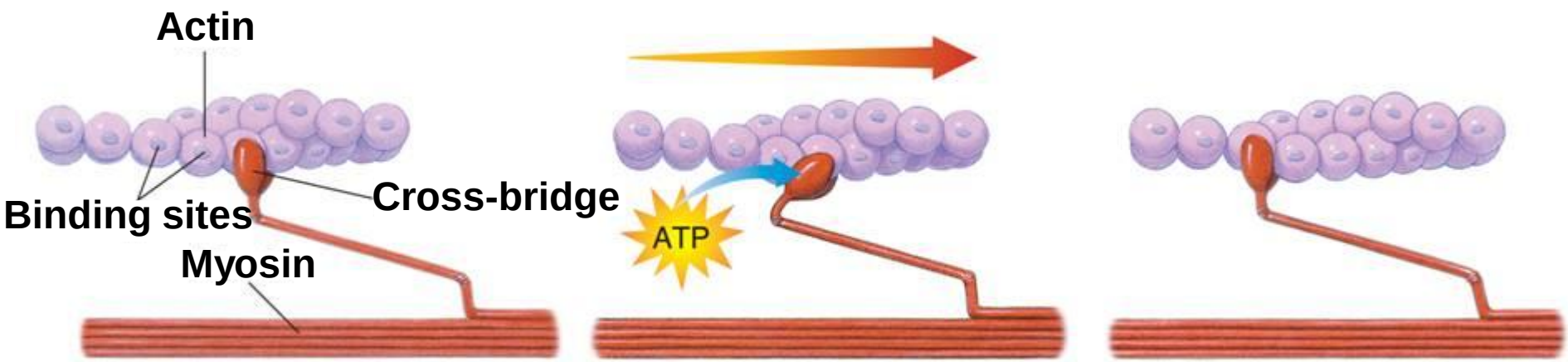
A muscle contracts when the thin filaments in the muscle fiber slide over the thick filaments.

This process is called the sliding filament model of muscle contraction.

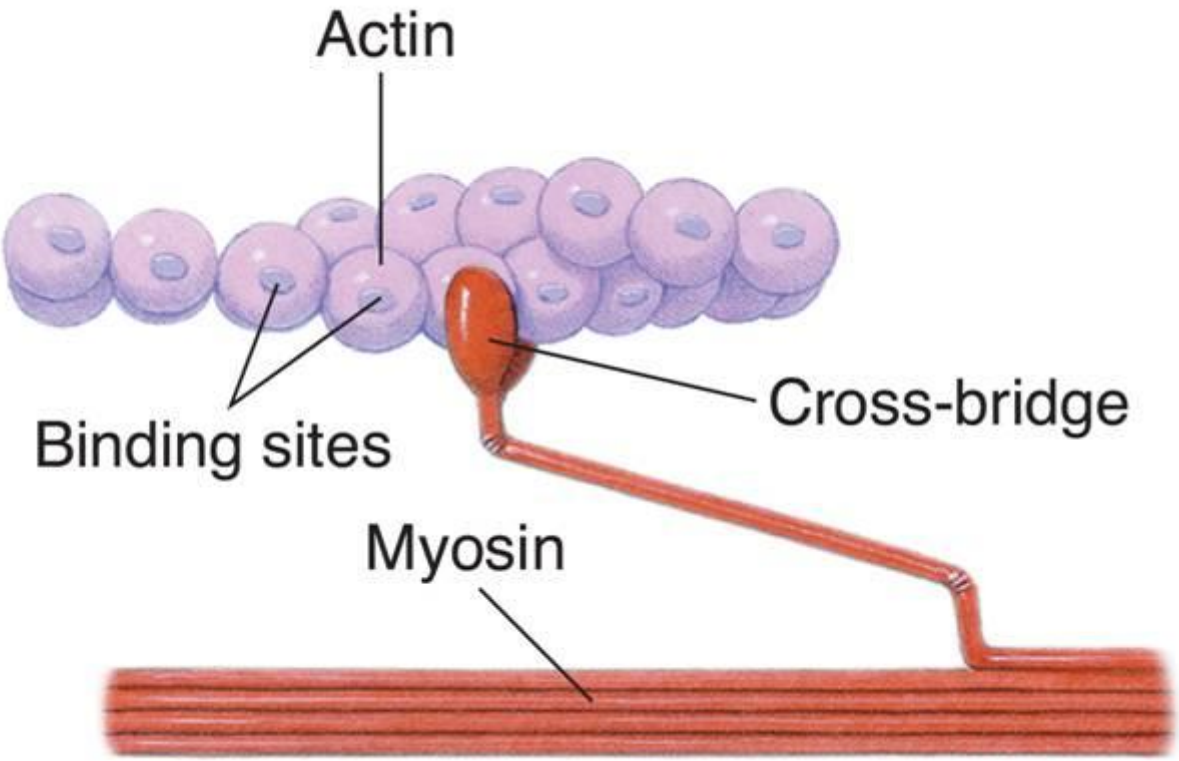
During muscle contraction, the actin filaments slide over the myosin filaments, decreasing the distance between the Z lines.



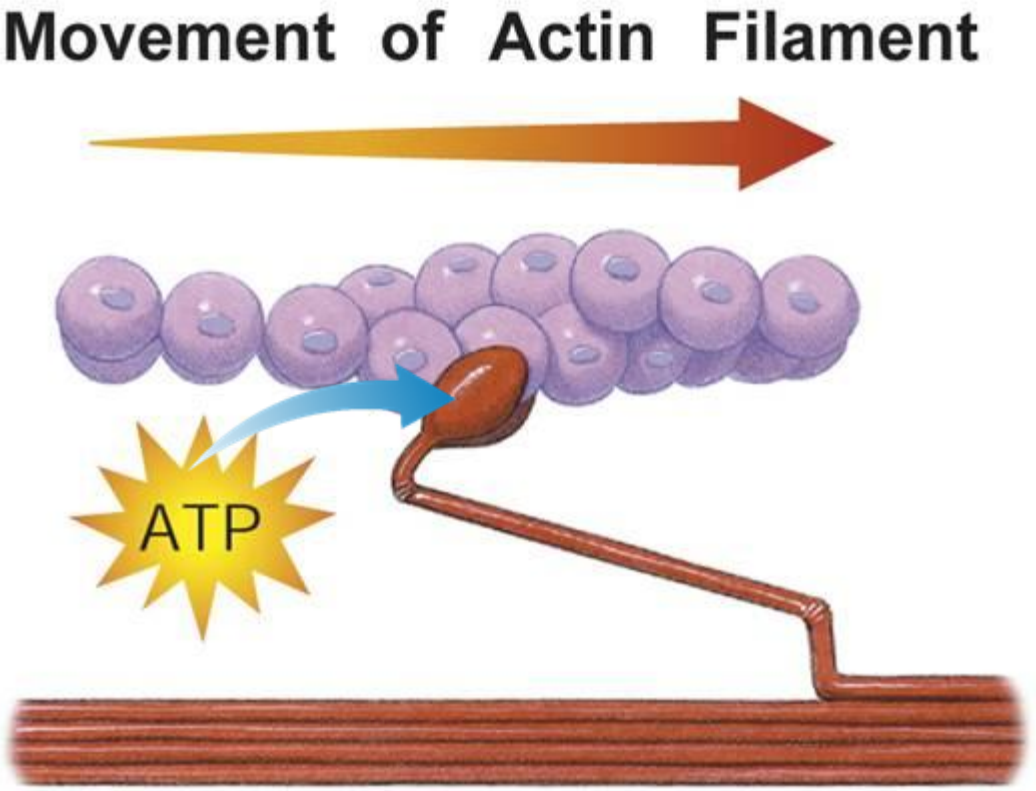
Movement of Actin Filament



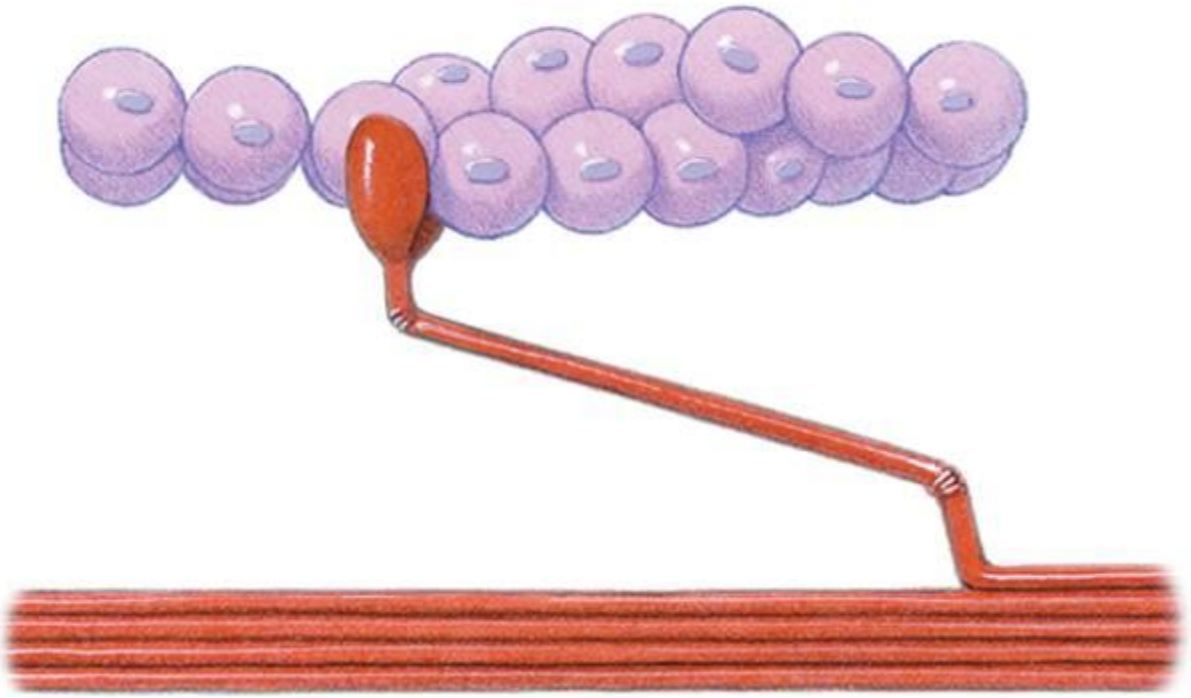
During muscle contraction, the head of a myosin filament attaches to a binding site on actin, forming a cross-bridge.



Powered by ATP, the myosin cross-bridge changes shape and pulls the actin filament toward the center of the sarcomere.



The cross-bridge is broken, the myosin binds to another site on the actin filament, and the cycle begins again.

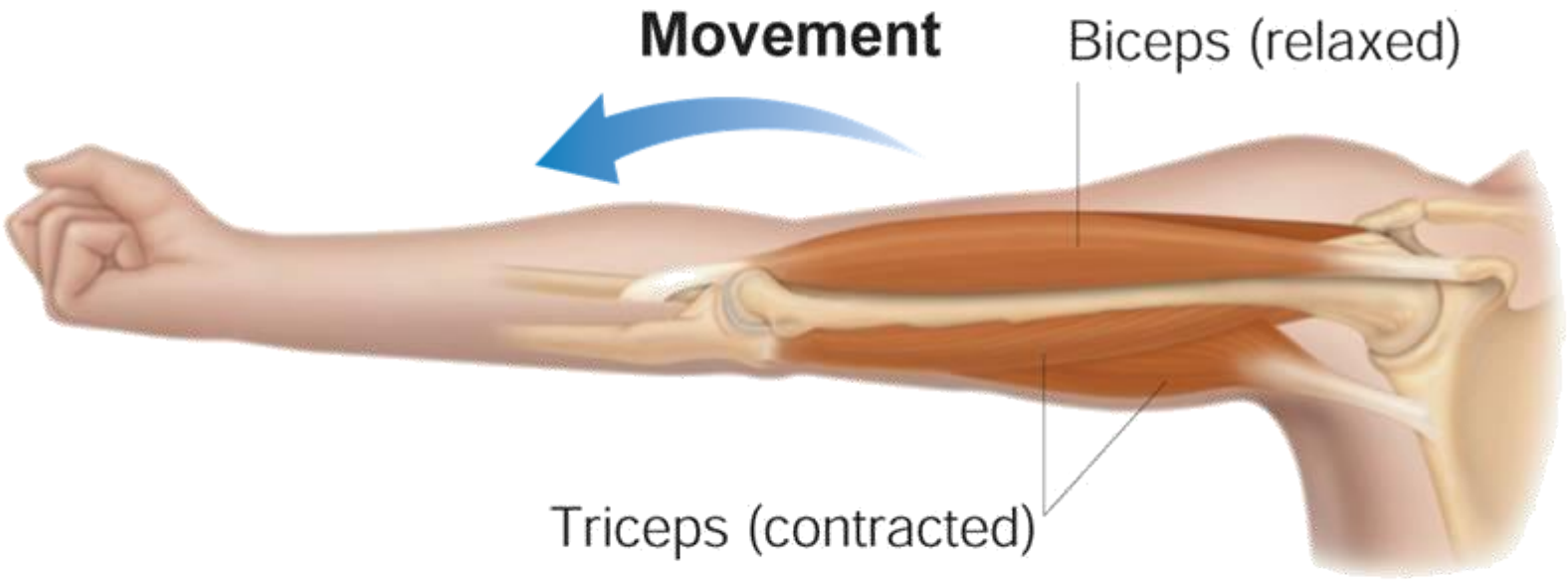


Control of Muscle Contraction

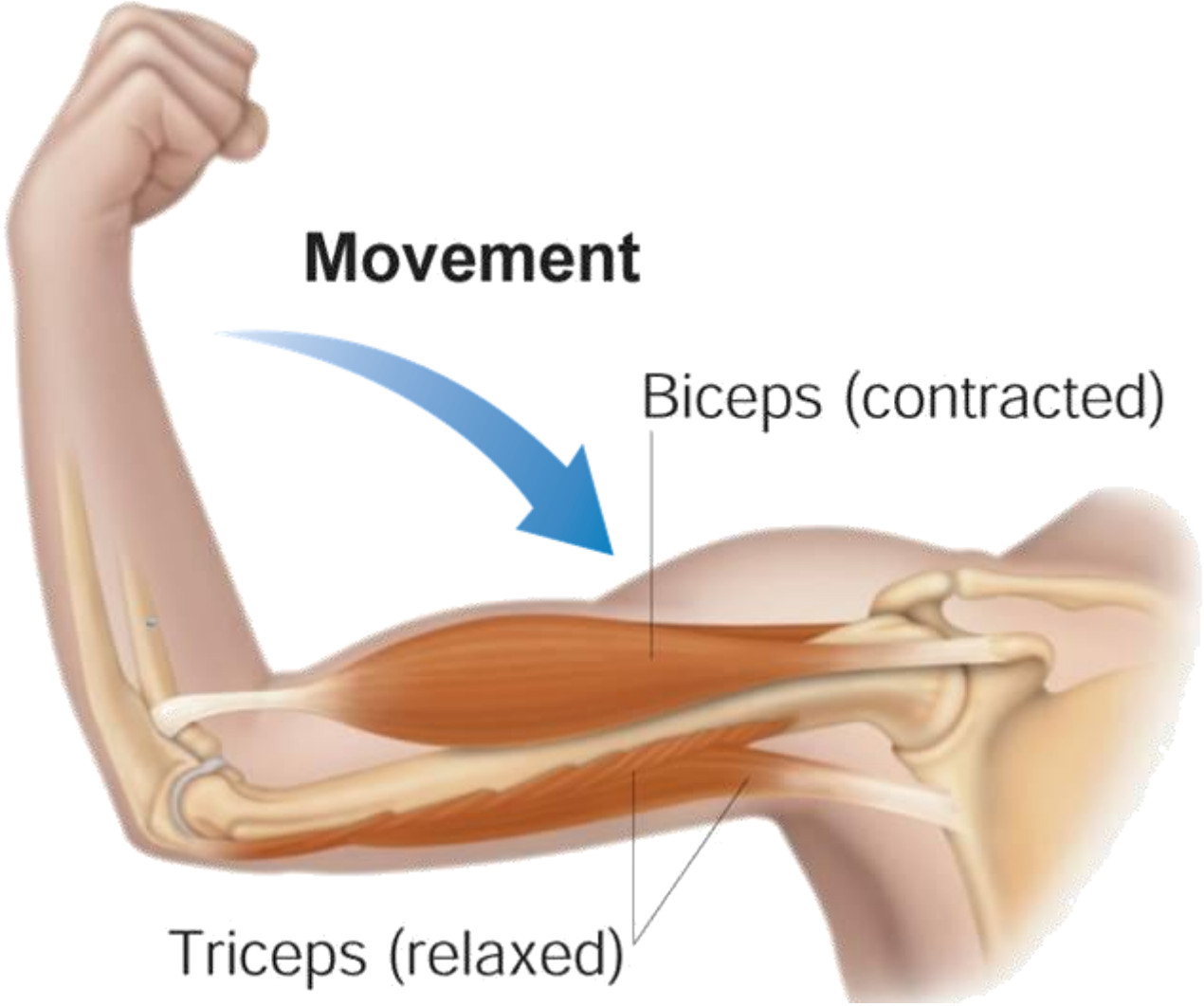
Impulses from motor neurons control the contraction of skeletal muscle fibers.

A **neuromuscular junction** is the point of contact between a motor neuron and a skeletal muscle cell.

Opposing Muscles Contract and Relax



Opposing Muscles Contract and Relax



Regular exercise is important in maintaining muscular strength and flexibility.

36–2 Section QUIZ

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36–2 Section QUIZ

1 Skeletal muscles are joined to bones by tough connective tissue called

a. ligaments.

A b. tendons.

c. filaments.

d. bursae.

2 Muscle cells that are large, have many nuclei, and striations are

A a. skeletal muscle cells.

b. smooth muscle cells.

c. cardiac muscle cells.

d. involuntary muscle cells.

3 Muscle that is found in the walls of blood vessels and intestines is

a. skeletal muscle.

A b. smooth muscle.

c. cardiac muscle.

d. striated muscle.

4 The filaments found in skeletal muscle cells are

A a. actin and myosin.

b. myosin and myofibrils.

c. actin and Z lines.

d. actin and sarcomeres.

5 The type of muscle found only in the heart is

a. skeletal muscle.

b. striated muscle.

A c. cardiac muscle.

d. smooth muscle.

END OF SECTION