

# Exercise 12 Review Sheet

## Microscopic Anatomy and Organization of Skeletal Muscle

Name \_\_\_\_\_ Lab Time/Date \_\_\_\_\_

### Skeletal Muscle Cells and Their Organization into Muscles

1. Use the items in the key to correctly identify the structures described below.

- \_\_\_\_\_ 1. connective tissue covering a bundle of muscle fibers
- \_\_\_\_\_ 2. bundle of muscle fibers
- \_\_\_\_\_ 3. contractile unit of muscle
- \_\_\_\_\_ 4. superficial sheath that covers the entire muscle
- \_\_\_\_\_ 5. thin areolar connective tissue surrounding each muscle fiber
- \_\_\_\_\_ 6. plasma membrane of the muscle fiber
- \_\_\_\_\_ 7. a long organelle with a banded appearance found within muscle fibers
- \_\_\_\_\_ 8. actin- or myosin-containing structure
- \_\_\_\_\_ 9. cord of collagen fibers that attaches a muscle to a bone

Key:

- a. endomysium
- b. epimysium
- c. fascicle
- d. myofibril
- e. myofilament
- f. perimysium
- g. sarcolemma
- h. sarcomere
- i. tendon

2. List three reasons why the connective tissue sheaths of skeletal muscle are important.

---

---

---

---

---

3. Why are there more indirect—that is, tendinous—muscle attachments to bone than there are direct attachments?

---

---

---

---

---

4. How does an aponeurosis differ from a tendon structurally? \_\_\_\_\_

\_\_\_\_\_

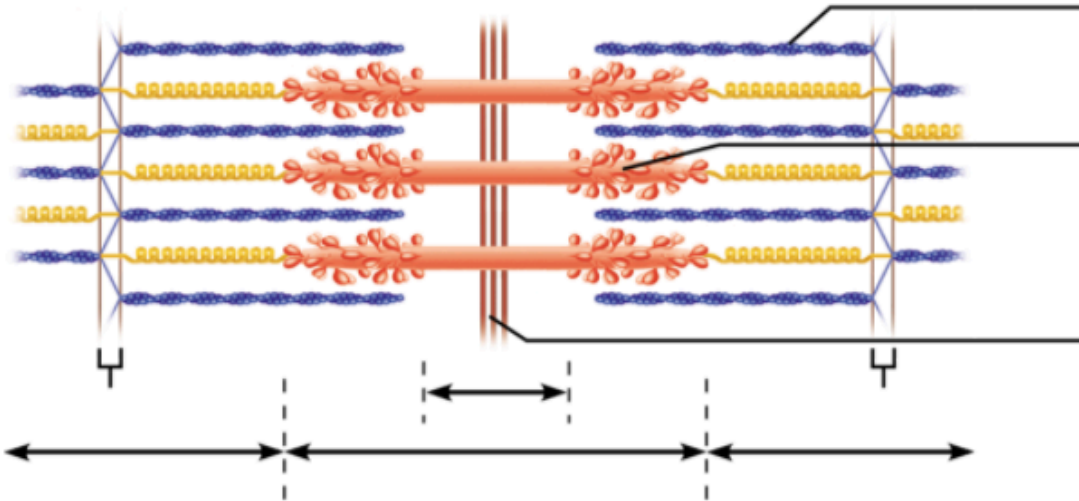
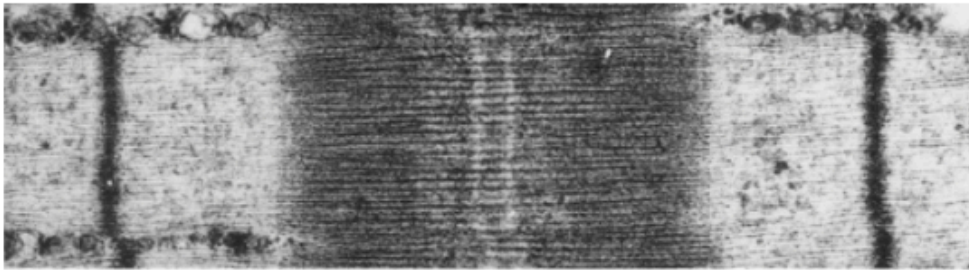
How is an aponeurosis functionally similar to a tendon? \_\_\_\_\_

\_\_\_\_\_

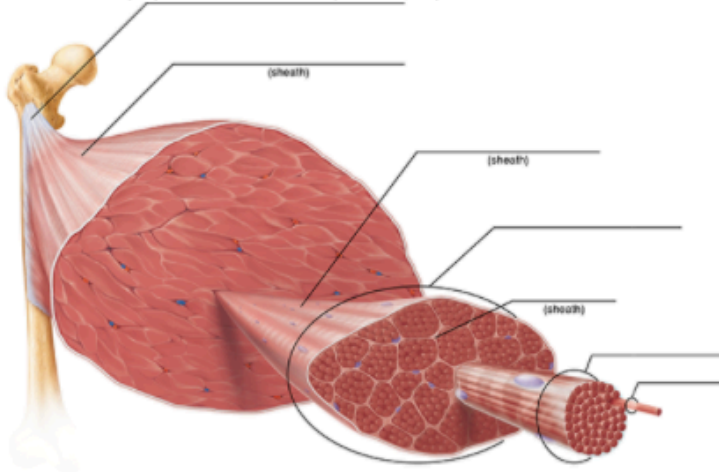
5. The drawing and photomicrograph below show a relaxed sarcomere. Using the terms from the key, identify each structure indicated by a leader line or bracket. The number 2 in parentheses indicates that the structure will be labeled twice.

Key:

- a. actin filament
- b. A band
- c. H zone
- d. I band (2)
- e. M line
- f. myosin filament
- g. Z disc (2)



6. On the following figure, label the endomysium, epimysium, a fascicle, a muscle fiber, a myofibril, perimysium, and the tendon.



## The Neuromuscular Junction

7. Complete the following statements:

The junction between a motor neuron's axon and the muscle fiber plasma membrane is called a   1   junction. A motor neuron and all of the skeletal muscle fibers it stimulates is called a   2  . The actual gap between the axon terminal and the muscle fiber is called a   3  . Within the axon terminal are many small vesicles containing a neurotransmitter substance called   4  . When the   5   reaches the ends of the axon, the neurotransmitter is released and diffuses to the muscle cell membrane to combine with receptors there. The combining of the neurotransmitter with the muscle membrane receptors causes a change in permeability of the membrane, resulting in   6   of the sarcolemma. Then, contraction of the muscle fiber occurs.

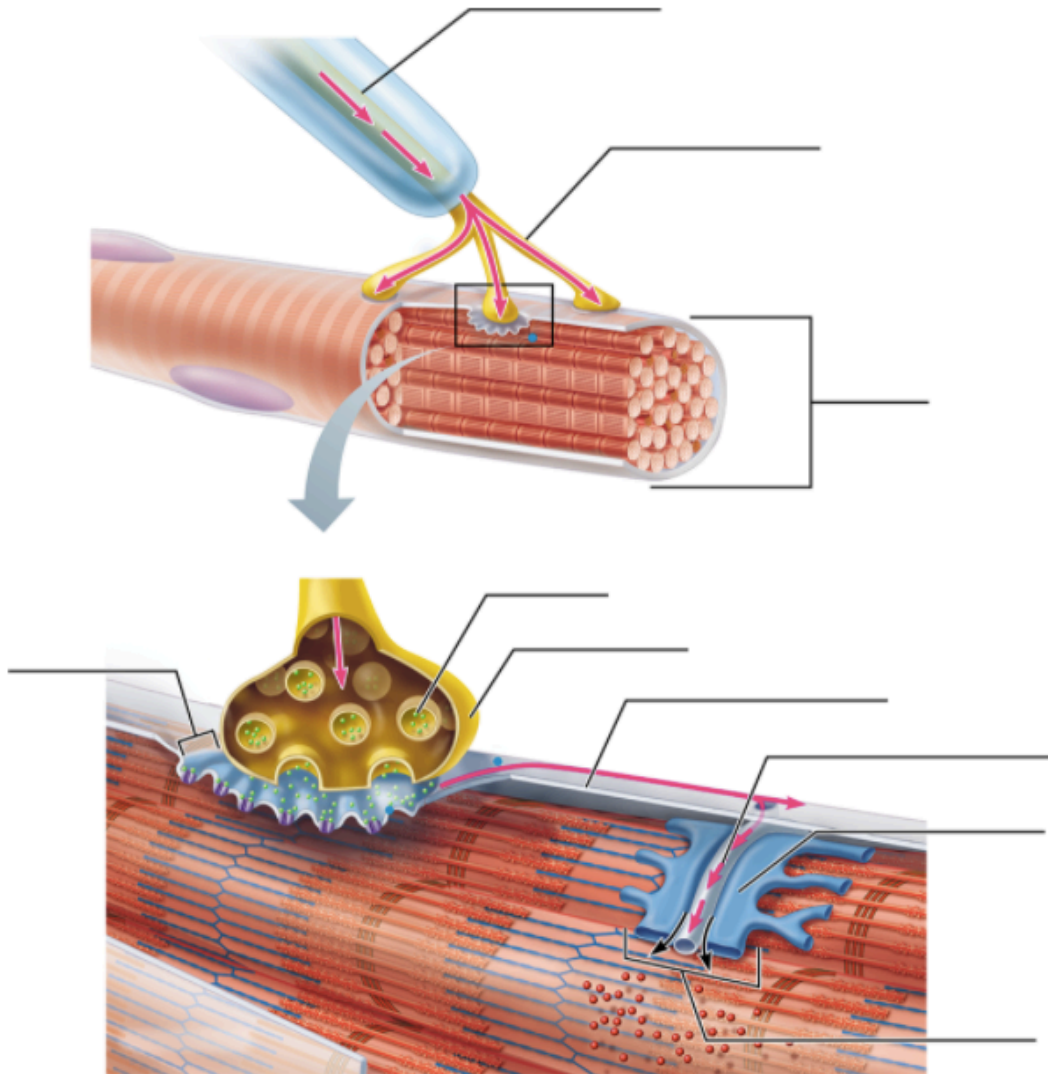
1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_

8. The events that occur at a neuromuscular junction are depicted below. Identify every structure provided with a leader line.

*Note:* The pink arrows depict the propagation of the action potential.

*Key:*

- a. axon terminal of motor neuron
- b. motor neuron axon branch
- c. myelinated axon of motor neuron
- d. muscle fiber
- e. sarcolemma of muscle fiber
- f. synaptic cleft
- g. synaptic vesicle containing ACh
- h. terminal cistern of the SR
- i. triad
- j. T tubule



9. **Clinical/Critical Thinking** Necrotizing fasciitis is a serious bacterial infection. Necrosis is death of tissues in the body. Considering the organization of the connective tissue sheaths of skeletal muscle, explain how this infection could spread rapidly throughout the body.

---



---



---

10. **Clinical/Critical Thinking** The bacterium *Clostridium botulinum* secretes botulinum toxin, a neurotoxin. The toxin blocks the release of acetylcholine from the axon terminal of a motor neuron. Explain how the toxin binding would change the normal sequence of events at the neuromuscular junction.

---



---



---