

Muscular Tissue
Chapter Ten Study Guide
Tortora & Derrickson

1. What is the primary function of a skeletal muscle?
2. How is connective tissue integrated into the structure of a skeletal muscle organ?
3. What is the structural component common in the tendon, the periosteum, the perforating fibers of bone and the endomysium?
4. What structure connects a skeletal muscle to a bone?
5. What structure connects a bone to a bone?
6. Explain how these terms are used to describe the movement of skeletal muscles: extensors, flexors, adductors, abductors, prime movers, synergist, antagonist, and fixators. (use the muscles of the pectoral girdle and arm as your reference)
7. What types of nerve innervate skeletal muscles? Nerve's name?
8. Is the nerve in #7 voluntary or involuntary?
9. What is inside the sarcolemma?
10. Define the skeletal muscle cellular structures and their functions (see Fig 10.2 + 10.3 // Table 10.3)
11. What is the name of the functional unit of a skeletal muscle?
12. What makes the striations in a muscle fiber?
13. Define the following structures: actin, myosin, troponin, tropomyosin, titin, dystrophin, z-disc, endomysium, sarcoplasmic reticulum, T-tubules, terminal cistern, triad, myofibrils.
14. What are the skeletal muscles' regulatory proteins?
15. What are the skeletal muscles' structural proteins?
16. What is the "triad"? Structure and function.
17. What structural protein holds the thick filament between the Z discs?
18. What is the name that describes the theory which explains how a skeletal muscle contracts?
19. What is a resting membrane potential?
20. What is an action potential?
21. How are action potential initiated?
22. Describe the structure of the neuromuscular junctions: (Fig 10.9)
23. Outline the sequence of steps associated with a muscle contraction: (from a nerve action potential to muscle relaxation) (Fig 10.10)
24. What occurs during excitation?
25. What occurs during excitation-contraction coupling?
26. What occurs during contraction?
27. What occurs during relaxation?
28. What must happen to stop a muscle contraction?
29. Describe a skeletal muscle's contraction cycle? List individual steps? (Fig 10.6)
30. What is rigor mortis?
31. After death, what event will cause the skeletal muscle to contract one more time? After this last contraction cycle, why is it impossible for the muscle to relax naturally?
32. After the last contraction cycle, why does the muscle eventually lose its tension?

33. What is the significance of the length-tension relationship of skeletal muscle? (Fig 10.8)
34. How does the resting length of a skeletal muscle affect the tension it creates?
35. Why should we “lift with our legs and not with our backs”?
36. What is the difference between an isotonic and isometric contractions?
37. What two metabolic pathways are available in most cells to make ATP?
38. Where are the two metabolic pathways for ATP production located in skeletal muscles?
39. What are the requirements for ATP by the two metabolic pathways?
40. How does skeletal muscles produce ATP during the first 15 seconds of muscle contraction when walking?
41. What is myoglobin and how is this molecule used by skeletal muscle?
42. Why do skeletal muscles have glycogen in their cytoplasm?
43. What is the phosphagen system?
44. How is muscle physiology different during anaerobic and aerobic ATP production?
45. What causes muscle fatigue?
46. What is the first source of ATP in a skeletal muscle when you start to run? What is the next source of ATP? Then the next? Next?
47. How does oxygen uptake influence skeletal muscle performance?
48. What is oxygen debt?
49. How are the muscle fibers of a sprinter different than muscle fibers of a marathon runner?
50. The soleus and gastrocnemius muscles are both plantar flexion muscles. How can you explain why we “evolved” two muscles with the same action?
51. Are muscles stronger than the bones? Explain
52. What factors determine muscular strength?
53. How is the muscle fiber changed by resistance exercise?
54. How is the muscle fiber changed by endurance exercise?
55. Why is cross training important?
56. Calcium plays a key role in muscle contraction. What muscle type depends only on the sarcoplasmic reticulum as its source of calcium?
57. What is the difference in how smooth muscle and cardiac muscle acquire calcium during a their muscle contraction?
58. What is muscular dystrophy? What “link” is broken in muscular dystrophy?
59. What is the difference between an intrinsic and extrinsic muscle?