

Muscular Tissue  
Chapter Ten Study Guide  
Tortora & Derrickson

1. What are the primary function of muscle?
2. What are the three kinds of muscle? Their characteristics?
3. How is connective tissue integrated into the structure of a skeletal muscle organ?
4. How may a bruise and the epimysium contribute to the loss of a limb? What is this condition called?
5. What connective tissue fiber is common in the tendon, the periosteum, the perforating fibers of bone and the endomysium?
6. What connects a skeletal muscle to a bone?
7. What structure connects a bone to a bone?
8. What is an aponeurosis?
9. What is a retinaculum? Explain how inflammation near a retinaculum may result in chronic pain?
10. 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 arm to answer this question)
11. What types of nerves innervate skeletal muscles? General name?
12. What are upper motor neurons? Two types?
13. What are lower motor neurons? Two types?
14. What are all muscle capable of doing? (Hint: convert what to what?)
15. Why is a skeletal muscle cell called a muscle fiber?
16. What is the structure inside the sarcolemma?
17. Define the skeletal muscle cellular structures and their functions (see Fig 10.2 + 10.3 // Table 10.3)
18. What is the name of the functional unit of a skeletal muscle?
19. What makes the striations in a muscle fiber?
20. Define the following structures: actin, myosin, troponin, tropomyosin, titin, dystropin, z-disc, endomysium, sarcoplasmic reticulum, T-tubules, terminal cistern, triad, myofibrils.
21. What are the skeletal muscles' regulatory proteins?
22. What are the skeletal muscles' structural proteins?
23. What is the "triad"? Structure and function.
24. What structural protein holds the thick filament between the Z discs?
25. What are linking proteins? What is linked to what?
26. What disease occurs if a gene fails to make dystrophin?
27. If skeletal muscles are in G zero then what does this mean?
28. What happens if the nerve going to a skeletal muscle is cut? What is this called? How may you cause the same result without cutting a nerve?
29. What are the three components of a synapse?
30. Describe the structure of the neuromuscular junctions: (Fig 10.9)
31. What is a resting membrane potential?
32. What is an action potential?
33. How are action potential initiated?

34. What type of tissues are able to generate action potentials?
35. What is the sliding filament theory?
36. Outline the sequence of steps associated with a muscle contraction: (from a nerve action potential to muscle relaxation) (Fig 10.10)
37. What are the four phases of a skeletal muscle contraction?
38. What occurs during excitation?
39. What occurs during excitation-contraction coupling?
40. What occurs during contraction?
41. What occurs during relaxation?
42. What is the power stroke?
43. What must occur to stop a muscle contraction?
44. Describe a skeletal muscle's contraction cycle? List individual steps? (Fig 10.6)
45. What is a motor unit?
46. How do we use motor units? Explain by picking up something or extending your arm and holding something in your palm.
47. What is rigor mortis? What might cause the skeletal muscles to contract one more time after death which could cause the corpse to sit up or roll over? Why is it impossible for the muscle to relax naturally after death? What explains the gradual loss of tension following rigor mortis?
48. What is the difference between an isotonic and isometric contractions?
49. Explain how isotonic-isometric occur sequentially during lifting a heavy object.
50. What is the significance of the length-tension relationship of skeletal muscle? (Fig 10.8)
51. How does the resting length of a skeletal muscle affect the tension it creates?
52. Why should we “lift with our legs and not with our backs”?
53. Explain recruitment using motor units.
54. How do cells make ATP? Name of metabolic pathways? Requirements? Locations?
55. What is the significance of fast and slow muscle fibers? What does this reference?
56. How are the muscle fibers of a sprinter different than muscle fibers of a marathon runner?
57. The soleus and gastrocnemius muscles are both plantar flexion muscles. How can you explain why we “evolved” two muscles with the same action?
58. How do muscle fibers change due to endurance training, resistance training, and disuse?
59. What is myoglobin? Location? Function?
60. Why do skeletal muscles have glycogen in their cytoplasm?
61. How long does cytosol ATP last after you start to run?
62. What is the phosphagen system?
63. How is muscle ATP physiology different during anaerobic and aerobic conditions?
64. What is the first source of ATP in a skeletal muscle when you start to run? What is the next source of ATP? Next? Next?
65. How does oxygen uptake influence skeletal muscle performance?
66. What causes muscle fatigue? How do muscle fibers rid itself of this molecule?
67. What is oxygen debt?
68. What is the difference in how smooth muscle and cardiac muscle acquire calcium during a their muscle contraction?

69. Do smooth muscle always require the action of a nerve to contract?
70. What occurs if you stretch smooth muscle? (hint: calcium)
71. What is the difference between single unit and multi-unit smooth muscle? Where will you find these smooth muscle types?