

Muscular Tissue
Chapter Eleven Study Guide

1. Why are skeletal muscle cells called muscle fibers?
2. What is the structural unit of a skeletal muscle fiber?
3. Define the structure and function of these items: sarcolemma, sarcoplasm, myofibrils, glycogen, myoglobin, sarcoplasmic reticulum, transverse tubules, triad, terminal cisterns, myofilaments, actin, myosin, mitochondria, nucleus) (See Fig 11.2)
4. Why do skeletal fibers look striated (striped)?
5. Define these structures: actin, myosin, troponin, tropomyosin, titin, dystrophin, z-disc. (Fig 11.1)
6. What are the skeletal fiber's regulatory proteins?
7. What are the skeletal fiber's structural proteins?
8. What are the skeletal muscle's linking proteins? What is linked to what? (Fig 11.4)
9. What disease is caused because a gene fails to make dystrophin?
10. What is a "triad"? Significance? (Fig 11.2)
11. What structural protein holds the thick filament between the Z discs?
12. Why are skeletal muscle fibers in G zero? Significance? What organelle is missing?
13. What will happen to the muscle fiber if the nerve to the skeletal fiber is cut? What is this called? How may you cause the same result without cutting a nerve? What is this called?
14. What is the sliding filament theory? (Fig 11.10)
15. Where is the neuromuscular junction's location? General name for this structure?
16. What are the three components of a synapse?
17. Describe the structure of the neuromuscular junctions: (Fig 11.7)
18. What is a resting membrane potential?
19. What is an action potential?
20. What tissues are able to generate action potentials?
21. How are action potential initiated at the neuromuscular junction? (Fig 11.8)
22. What occurs during excitation? Location?
23. What occurs during excitation-contraction coupling? Location?
24. What occurs during contraction cycle? Location?
25. What occurs during relaxation? Location?
26. What are the sequence of events during the power stroke? (Fig 11.10)
27. How do you stop a muscle contraction?
28. What is a motor unit?
29. How do we use motor units? Explain this phenomena by picking up something or by extending your arm and holding something in your palm. (Fig 11.6)
30. What is recruitment? Explain this in terms of picking up a book.
31. What is rigor mortis? Why does this occur?
32. After death the corpse may sit up or roll over? How can you explain this phenomena?
33. After death the muscle stiffens but then over time the muscle starts to relax. Why?
34. What is the difference between an isotonic and isometric contractions?
35. Why is it that when you pick up a heavy item, at first it is an isometric contraction then followed by an isotonic contraction?
36. What is the significance of the length-tension relationship of skeletal muscle? (Fig 11.2)
37. How may the length of a muscle fiber affect the tension produced? What is this relationship called? Explain this phenomena in terms of the structure of the sarcomere.
38. Why should we "lift with our legs and not with our backs"?
39. How do cells make ATP? What are the requirements? Locations?
40. What is the difference in ATP produced by fast and slow muscle fibers? How does this related to performance during competition?

41. How do muscle fibers of a sprinter differ than muscle fibers of a marathon runner?
42. The soleus and gastrocnemius muscles are both plantar flexion muscles. It is unusual for evolution show this type of redundancy. How may you explain why this occurred?
43. How do muscle fibers change due to endurance training, resistance training, and disuse?
44. What is myoglobin? Location? Function?
45. Why do skeletal muscles have glycogen in their cytoplasm?
46. How long does it take to deplete glycogen from the liver when you are running?
47. What is the phosphagen system? Purpose?
48. How is the production of ATP different in anaerobic and aerobic conditions?
49. When you start to run, what is the first source of ATP used by the skeletal muscle? What is the next source of ATP? The next? Next?
50. How may the availability of blood oxygen influence skeletal muscle performance? What is the implication for the respiratory and cardiovascular systems?
51. What causes muscle fatigue? How do muscle fibers rid itself of this molecule? Where does it go? Once there then what happens to this molecule?
52. What is oxygen debt? What is another name for this phenomena?
53. What is the difference between single unit and multi-unit smooth muscle? Where will you find these smooth muscle types? (Fig 11.22)
54. Do smooth muscle always require the action of a nerve to contract?
55. What occurs if you stretch smooth muscle? (hint: calcium)