

Chapter Ten Study Guide / Tortora & Derrickson  
Muscular Tissue

1. What are the three types of muscular tissue? How are these muscle types characterized?
2. What are the functions of muscular tissue?
3. How is connective tissue integrated into the structure of skeletal muscle?
4. What is the relationship between the perforating fibers of bone and the endomysium?
5. What is the connective tissue at the ends of a muscle organ called?
6. Explain how these terms are used to describe the movement of muscles: extensors, flexors, adductors, abductors, prime movers, synergist, antagonist, antagonistic pairs, fixators. (use the muscles of the pectoral girdle and arm as your reference)
7. What types of nerve innervate skeletal muscles? (voluntary or involuntary)
8. What is inside the sarcolemma?
9. Define the skeletal muscle fiber structures and their functions (see Fig 10.2 + 10.3 // Table 10.3)
10. What makes the striations in a muscle fiber?
11. What is the name that describes the theory which explains how a skeletal muscle contracts?
12. What is the contraction cycle? (Fig 10.6)
13. What is a motor neuron?
14. Describe the anatomy of a neuromuscular junctions: (Fig 10.9)
15. Outline the sequence of events associated with a muscle contraction: (Fig 10.10)
16. Be able to outline the steps in excitation-contraction coupling of a skeletal muscle:
17. What is an action potential?
18. How is an action potential created?
19. What is a resting membrane potential?
20. What are the four major phases associated with muscle contraction and relaxation?
21. What is rigor mortis? Explain rigor mortis in the context of skeletal muscle physiology:
22. What is the length-tension relationship of skeletal muscle? (Fig 10.8)
23. How does the position of the sarcomere myofibrils change during the length-tension relationship?
24. How does the resting length of a skeletal muscle affect the tension it can create?
25. Why should we “lift with our legs and not with our backs”?
26. What is the difference between isotonic and isometric contractions?
27. What are the two types of isotonic contraction?
28. What two metabolic pathways are used by most cells in the human to make ATP?
29. Where are the enzymes for the metabolic pathways for ATP production located?
30. What are the requirements for ATP production for the two metabolic pathways?
31. How do skeletal muscles produce ATP during the first 15 seconds of muscle contraction? Why is this required?
32. What is myoglobin and how is this molecule used by skeletal muscle?

33. What is the phosphagen system? What two enzymes play a role in the phosphagen system?
34. How does short-term and long-term ATP production differ?
35. What causes muscle fatigue?
36. How is ATP produced by the skeletal muscle when you start to use your muscles but you can not deliver enough oxygenated blood to the organ? What is this called? (duration of energy provided during initial two minutes)
37. How does maximum oxygen uptake influence performance?
38. What is oxygen debt?
39. How do the muscle fibers of a sprinter differ from those of a marathon runner?
40. The soleus and gastrocnemius muscles are both plantar flexion muscles. How can you explain why we “evolved” two muscles with the same action?
41. Are muscles stronger than the bones? Explain
42. What factors determines muscular strength?
43. How is the muscle fiber changed by resistance exercise?
44. How is the muscle fiber changed by endurance exercise?
45. Why is cross training important?
46. Calcium plays a key role in muscle contraction. What muscle type depends only on the sarcoplasmic reticulum as its source of calcium?
47. How does the sarcoplasm differ between the three muscle types?
48. How is the role of calcium different in smooth muscle and cardiac muscle? How does this affect the physiology of smooth and cardiac muscle?
49. What is muscular dystrophy? What “link” is broken in muscular dystrophy?
50. What is the difference between an intrinsic and extrinsic muscle?