

9: Muscles and Muscles Tissue

Objectives

Overview of Muscle Tissues

1. Compare and contrast the basic types of muscle tissue.
2. List four important functions of muscle tissue.

Skeletal Muscle

3. Describe the gross structure of a skeletal muscle.
4. Describe the microscopic structure and functional roles of the myofibrils, sarcoplasmic reticulum, and T tubule(s) of skeletal muscle fibers.
5. Describe the sliding filament model of muscle contractions.
6. Explain how muscle fibers are stimulated to contract by describing events that occur at the neuromuscular junction.
7. Describe how an action potential is generated.
8. Follow the events of excitation-contraction coupling that lead to cross bridge activity.
9. Define motor unit and muscle twitch and describe the events occurring during the three phases of a muscle twitch.
10. Explain how smooth, graded contractions of a skeletal muscle are produced.
11. Differentiate between isometric and isotonic contractions.
12. Describe three ways in which ATP is regenerated during skeletal muscle contraction.
13. Define oxygen deficit and muscle fatigue. List possible causes of muscle fatigue.
14. Describe factors that influence the force, velocity, and duration of skeletal muscle contraction.
15. Describe three types of skeletal muscle fibers and explain the relative value of each type.
16. Compare and contrast the effects of aerobic and resistance exercise on skeletal muscles and on other body systems.

Smooth Muscle

17. Compare the gross and microscopic anatomy of smooth muscle fibers to that of skeletal muscle fibers.
18. Compare and contrast the contractile mechanisms and the means of activation of skeletal and smooth muscles in the body.
19. Distinguish between single-unit and multiunit smooth muscle structurally and functionally.

Developmental Aspects of Muscles

20. Describe the embryonic development of muscle tissues and the changes that occur in skeletal muscles with age.