

# Bio& 241 Unit 3

## STUDY GUIDE

G. Brady & G. Blevins



### CHAPTER 10: Muscle Tissue

1. Know the basic functions of muscle tissue.  
Produce movement, maintain posture, support soft tissues, sphincter control and thermoregulation.
2. Know the connective tissue organization associated with skeletal muscle tissue: epimysium, perimysium, fascicle, endomysium, satellite cells, tendon, aponeurosis.
3. Know the following structures associated with the histology of muscle tissue and identify the structural components of a sarcomere:
  - A. **Skeletal Muscle:** muscle fiber, sarcolemma, sarcoplasm, sarcoplasmic reticulum, transverse (T) tubule, myofibrils, sarcomere, I band, A band, Z line, H zone, M line, thin filaments, thick filaments, actin, myosin, myoglobin.
  - B. **Cardiac Muscle:** cardiac myocytes, sarcolemma, sarcoplasm, sarcoplasmic reticulum, transverse tubule, myofibrils, sarcomere, I band, A band, Z disc, H zone, M line, thin filaments, thick filaments, actin, myosin, gap junctions, intercalated discs, desmosomes.
  - C. **Smooth Muscle:** visceral smooth muscle tissue, multiunit smooth muscle tissue, sarcolemma, sarcoplasm, intermediate filament, dense body.
4. Know the characteristics of the three types of muscle tissue.
5. Understand the sliding filament mechanism theory for the contraction of skeletal and cardiac muscle. Know the following structures or compounds involved in this mechanism in addition to those structures listed above for histology: Tropomyosin, troponin, myosin binding site, Ca<sup>++</sup> channel, Ca<sup>++</sup> active transport pumps, ATP, acetylcholine, acetylcholinesterase.
6. Know the summary of events of contraction and relaxation in a skeletal muscle fiber and the following associated structures and the control of skeletal activity by the nervous system. (motor neurons, motor unit, neuromuscular junction motor end plate)

7. Know the difference between isotonic (concentric or eccentric) contractions and isometric contractions.
8. Know the following characteristics of muscle contraction:  
All-or-none principle, internal tension, external tension, muscle tone.
9. Know the following characteristics of muscle contraction and be able to label the following types of myograms:
  - A. **Characteristics:** latent period, contraction phase, relaxation phase, recruitment, muscle tone, "all or none" principle.
  - B. **Myograms:** twitch, incomplete tetanus, complete tetanus, wave summation, treppe.
10. Understand muscle metabolism. Production of ATP in muscle fibers, creatine phosphate, anaerobic and aerobic cellular respiration, Krebs cycle, electron transport system, lactic acid, muscle fatigue, oxygen debt, recovery period. Be able to calculate the number of ATP produced by each step of cellular respiration.
11. Know hormones that help regulate muscle activity
  - a. **Growth hormone and testosterone:** stimulate the synthesis of contractile proteins and enlarge skeletal muscles
  - b. **Thyroid hormones:** Elevate the rate of energy consumption by resting and active muscles
  - c. **Epinephrine:** Stimulates muscle metabolism and increases both duration and force of contraction.
12. Know the three types of muscle fibers and their characteristics (slow, intermediate, and fast)
13. Know the following clinical terminology associated with the Muscular System:
  - A. **Terms:** DOMS (delayed onset muscle soreness), atrophy, hypertrophy, rigor mortis, Hypotonia, flaccid paralysis, Hypertonia, spasticity, spastic paralysis, rigidity, Myalgia, Myoma, Myomalacia, Myositis, Myotonia, Volkmann's contracture
  - B. **Disorders:** Duchenne's muscular dystrophy, myasthenia gravis, polio, fibromyalgia
  - C. **Abnormal contractions:** spasm, cramp, tic, tremor, fasciculation, fibrillation

## CHAPTER 11: THE MUSCULAR SYSTEM

1. Know the characteristics that are used to name skeletal muscles. Be able to provide an example of muscles named according to these parameters. (See Lecture 1 PowerPoint presentation)

2. Understand the types of muscle action at joints: Prime mover or agonist, antagonist, synergists, fixators.
3. Be able to identify muscles and their actions, or origins, actions and insertions as indicated on the Muscle List Handout.
4. Know the following **clinical terminology**:
  - a. carpal tunnel syndrome, compartment syndrome, diaphragmatic hernia, inguinal hernia, fibrosis, ischemia, impingement syndrome, Plantar fasciitis, shin splints,