**STUDY GUIDE MUSCLE**

**VOCABULARY**

Cardiac muscle Smooth muscle Skeletal muscle

Striated muscle Voluntary Involuntary

Purkinje fibers Intercalated discs Epimysium

Perimysium Endomysium Sarcomere

A & I bands Z disc Troponin

Tropomyosin Sarcoplasmic reticulum T tubule

Triad Diad

**OBJECTIVES AND QUESTIONS**

1. Be able to differentiate the three types of muscle based on presence or absence of striations, voluntary vs. involuntary, histological features such as multinucleated vs. mononucleated and location of nucleus (e.g., central vs. peripheral). (Example: cardiac muscle – striated, involuntary, and central mononucleated).
2. Understand the organization of the connective tissue layers of skeletal muscle.
3. Understand the organization of the sarcomere and the components that make it up. (Example: I band – actin, Tropomyosin, troponins). Understand the mechanism of contraction of the sarcomere in basic terms. (Hint: troponin T attaches tropomyosin to troponin, calcium binds to troponin C causing a conformational change in troponin moving troponin I out of the way so that myosin can bind to actin, and following actin binding there is movement of the myosin head which cases sliding of the thin filament). Understand calcium regulation in muscle cells. What is the T tubule and what is its significance? What is the sarcoplasmic reticulum and what is its role in contraction? (Hint: sarcoplasmic reticulum releases and recovers calcium). Note the difference in the organization of the T tubule and sarcoplasmic reticulum between skeletal and cardiac muscle. (Hint: triad vs. diad). Note also that even though there are no striations in smooth muscle, contraction is similar – calcium regulated sliding filament mechanism of lattice of actin and myosin.
4. What are intercalated discs? Which cellular junctions are present in intercalated discs? What are purkinje fibers? (Hint: modified cardiac muscle cells which function in depolarization of the ventricles – see pp. 256-7 of text for purkinje system. Note purkinje fibers are in the heart, purkinje cells are found in the brain – you don’t need to know about purkinje cells but don’t call the ones in the heart “purkinje cells” unless you don’t mind being incorrect).
5. Can muscle regenerate? (Hint: smooth muscle can readily, cardiac and skeletal muscle cannot). What other tissues can you think of that readily regenerates? (Examples: epithelial tissue – epithelial cells; connective tissue – fibroblasts; cartilage and bone has less ability to regenerate but can by mechanisms you all have no doubt committed to memory).