**Essay Questions for Unit 2 Exam**

1. Describe the molecular characteristics of the contractile filaments found within the functional unit of the skeletal muscle cell; the sarcomere. Describe the mechanism by which an action potential in the sarcolemma results in release of Ca++ from the sarcoplasmic reticulum followed by a description of the molecular mechanisms of muscle contraction. In part 2 of this essay, discuss the various sources of energy utilized for muscle contraction. Include the relative amount of each source available to the cell, the advantages and disadvantages of each type, under what conditions each might be used, etc. Describe the two main types of smooth muscle. Describe the molecular mechanisms of muscle contraction in smooth muscle. Begin at the point of Ca++ entry and end at the point contraction ends. Compare and contrast smooth and skeletal muscle structurally, functionally, and regulation. Finally, describe and explain and then compare and contrast the muscle sensory receptors: muscle spindles and golgi tendon organs. Describe the stretch reflex and the withdrawal reflex.

2. Describe the chemoreception of smell and taste. Describe how energy carried by sound waves turns into mechanical vibrations, fluid waves, chemical signals and finally action potentials for the things we hear.  Explain how the eye focuses light.  Be sure to mention the role of the ciliary body and suspensory ligaments surrounding the lens. Describe the two types of photoreceptors and explain how they convert light into electrical energy. Explain how center and surrounds cooperate in a visual field. Finally, describe the mechanisms of hearing. Include the part of the middle and inner ear and their roles. Discuss how the hair cells produce action potentials in the cochlear nerve.