

## **Biology 251 Fall 2009 Study Guide for Exam 3**

Exam 3 is on Tuesday 3 November Noon to 1:15. The exam will consist of multiple choice questions. Questions will cover Topics 11 through 17. Topics on which you will be explicitly questioned are:

Topic 11: Skeletal Muscle: Molecular Basis of Contraction

Topic 12: Skeletal Muscle: Mechanics

Topic 13: Smooth and Cardiac Muscle

Topic 14: Cardiovascular System: Anatomy and Electrical Activity of the Heart

Topic 15: Cardiovascular System: Mechanics and Control of the Heart

Topic 16: Cardiovascular System: Blood Vessels

Topic 17: Blood and Blood Pressure

Questions will be to the level of detail presented in lecture; therefore, you will not be held responsible for detail presented in the book but not covered in lecture. About 10% of the questions will focus on the special clinical and applied examples given in class but that are not in the printed lecture notes.

You can bank on questions about the function of skeletal, smooth, and cardiac muscle, so understand the structure of each (e.g., myofibril, single-unit and multi-unit smooth muscle), molecular mechanisms of how they function in detail (e.g., the role of  $\text{Ca}^{++}$  and ATP in cross bridge cycling), how the 3 muscle types are similar and different to each other (e.g., calmodulin and myosin kinase vs. troponin and myosin ATPase), and the mechanics of whole muscles. You should also understand the energetics of skeletal muscle contraction and different skeletal muscle fiber types.

You can count on questions about how blood flows through the heart, systemic circulation, and pulmonary circulation; how action potentials originate in autorhythmic cells and move through the contractile cells; how electrical activity moves through the entire heart (e.g., SA node, AV node, etc.); what is occurring in terms of electrical activity, pressures, and contraction in each portion of the ECG; and on cardiac output and control of heart function. Questions on blood vessels, blood and blood pressure will focus on how blood moves through the various blood vessels; capillary exchange and the lymph system; and how heart function and blood pressure are controlled and regulated.

To prepare for this exam, I suggest studying the lecture notes thoroughly and at the same time referencing the figures in the book. If some concepts do not make sense, then read those sections in the book for clarification; otherwise do not spend too much time reading the book. In addition, I suggest preparing your own exam questions and exchanging your practice exam with other students in the class. You should also spend time drawing and labeling important figures from class, such as ECG, action potential graphs, etc. Finally exam questions from a previous year have been posted on the course web site for use as a practice exam.