

Bio 235

Exam 3 Review Guide

Muscle Physiology

- Know the different types of muscle tissue, how they differ and where they are used
- know the different types of skeletal muscle fibers
- know the different types of smooth muscle
- Understand the events that occur at the neuromuscular junction
- Understand how the events at the neuromuscular junction initiate muscle contraction
- Know the process of excitation-contraction coupling in the three different muscle types
- Understand the all-or-none principle of muscle tissue and how the refractory periods in the tissues allow for the unique characteristics of the muscle types
- Know the events of the actual contraction of muscle (sliding filament theory)
- Know how muscles increase strength
- Be familiar with the adaptive responses the muscle tissues undergo.
- Understand how muscles use energy and the sources of energy that are available for muscles to function
- Be able to compare and contrast skeletal muscle, cardiac muscle and smooth muscle in terms of how they function and how their anatomy allows for the differences in function

Cardiovascular System

- **Heart**
 - Understand the difference between pacemaker potentials and normal cardiac muscle action potentials.
 - Be familiar with the different phases of the cardiac action potential and why the plateau phase is critical.
 - Know the conduction system of the heart and how it regulates cardiac cycle
 - Be familiar with the waves, segments and intervals of a normal ECG
 - Know the phases of the cardiac cycle and what is occurring at each phase (blood volume, pressure, sounds, blood movement).
 - Know how the heart is controlled, both intrinsically, (local control), and extrinsically.
 - Be able to define cardiac output, and know the factors that control both stroke volume and heart rate.
 - Know Starling's Law and its implications
- **Blood, Blood Vessels, and Blood Pressure**
 - Be familiar with the composition of blood, and the components of plasma and formed elements.
 - Know the basic functions of erythrocytes, leukocytes and thrombocytes (platelets).
 - Understand the major steps and the processes involved with hemostasis.
 - Understand the differences in structure of the blood vessels, and what they mean to the functioning of them.
 - Understand how substances move across the capillary membrane (bulk flow, filtration, reabsorption...)
 - Be familiar with the patterns of blood flow in the systemic circuit, and how it is regulated.
 - Know the blood flow through the pulmonary circuit.
 - Understand how vessel diameter and blood viscosity are involved in determining blood pressure.
 - Know the theory behind blood pressure recordings.
 - Understand how heart rate, stroke volume and total peripheral resistance influence mean arterial blood pressure.
 - Know the various ways in which blood is returned to the heart (venous return).

- Know and understand how lymph is formed, and the basic functions of the lymphatic system.
- **Cardiovascular regulation**
 - Understand the difference between short term and long term controls of MAP.
 - Know how baroreceptors work, and how they can be involved with the control of MAP.
 - Be familiar with the neural pathways that are controlling cardiovascular function.
 - Understand the baroreceptor reflex.
 - Be familiar with the hormonal control of MAP (effects of epi, ADH, Angiotensin II)
 - Be familiar with intrinsic control of blood distribution (ischemia, hyperemia, stretch...)
 - Understand how the cardiovascular system responds to temperature changes and exercise.

Lymphatic and Immune Systems

- Be familiar with the functions and organization of the lymphatic system
- Know the basic laws by which the immune system works as far as being able to differentiate "self" from "non-self"
 - be familiar with the MHC types
- Understand the differences and functions of the primary and secondary lymphatic structures
- Be familiar with the various innate defenses
- Understand that there is some overlap between innate and adaptive immunity
- Be familiar with the processes of adaptive immunity (cell-mediated and anti-body mediated immunity)
- Understand the differences between antigens and antibodies
 - be familiar with the different classes of antibodies and their general functions
- Understand antigen presenting and processing as it relates to cell-mediated and anti-body mediated immunity

Disclaimer: this is just a quick overview of material covered in class (lecture and lab). It is not all inclusive, so go over your notes and read the material in the book as well!