

CSM Biol 260 Study Guide 3 Fall 2009

Circulatory System

1. Describe the components of the circulatory system. Discuss functions.
2. Describe the characteristics and components of blood. For plasma, list components and describe their functions. List each type of formed element – RBC, WBCs, and platelets and describe their characteristics and functions. What is the structure of hemoglobin? What happens to hemoglobin when RBCs die?
3. Describe common blood lab tests and describe the implications of abnormal results. Explain blood types and their significance. Describe anemias and other common blood pathologies like hemophilia, transfusion reactions, leukocytosis, leucopenia, etc.
4. Illustrate or describe the process of hemostasis, i.e. blood clotting, including the key molecular components of both the extrinsic and intrinsic mechanisms. Describe the roles of anticoagulant molecules.
5. Describe the anatomy of the heart with respect to the cardiac cycle. Describe the events of systole and diastole, including blood flows, valve changes, pressure changes, heart sounds.
6. Explain the processes of cardiac muscle action potentials and nodal action potentials. Contrast these with skeletal muscle or neural action potentials.
7. Trace a normal ECG. Define it's parts and describe the process of generating the ECG. Discuss the use of the ECG recording vs. other heart measurements like auscultation or BP measurements. Be able to analyze and diagnose tracings of PVCs, PACs, AV block, sinus tachycardia, sinus bradycardia, ventricular fibrillation, ischemia, and myocardial infarction. Know the normal ranges for P-R interval, QRS duration, etc.
8. Define cardiac output. Correlate cardiac output to changes that may occur in heartrate or stroke volume. Draw a flow chart to illustrate the cascade of events that might occur with changing blood volume, or hemorrhage, or exercise, etc. Describe the effect of preload, afterload and contractility on cardiac output. Look at the factors that regulate cardiac output.
9. Describe the structure and function of the blood vessels: arteries, arterioles, capillaries and veins. Explain how elastic arteries function to dampen pulse pressure. Compare arteries to veins with respect to pressure, size, wall structure, capacity. Describe how blood gets back to the heart in veins. Map the factors contributing to venous return.
10. Show the Starling forces that affect the dynamics of fluid movement from capillaries to interstitium and lymph vessels, discuss factors that may influence these forces. List and comprehend sources of edema.
11. Describe systolic, diastolic, pulse and mean arterial pressure. Describe blood pressure regulation mechanisms. Describe the effect of various factors on blood pressure. Use table 16.3 to answer questions about the role of SNS or PSNS on arterioles leading to various tissues. Describe the mechanisms of action for three main anti-hypertensive drugs – diuretics, ACE inhibitors, beta- blockers.

12. Show the formula that describes blood flow. What physiological variables can affect flow? Describe the regulatory mechanisms affecting blood flow and blood pressure. Define pulse pressure and mean arterial pressure and discuss their impact on blood flow. Answer questions about the impact of various factors on blood flow
13. Discuss local regulation of blood flow including metabolic mechanisms.
14. Explain or illustrate how the first line of defense prevents pathogens from getting a foothold in the body.
15. Explain or outline how the second line of defense in the body fights pathogens. Include the activation by helper T cells.
16. Outline the components of the third line of defense, the acquired immune system. Explain what is meant by antigen, epitope, MHC, antigen recognition, activation, and attack.
17. Draw an antibody, describe their characteristics, genetics, classes, and actions.
18. Describe active and passive immunity, artificial and natural immunity, immunologic memory.
19. Draw and describe antigen presentation, recognition by T helper cell, killer T cells, and B cells. Describe the interaction between these cells that is required to mount a complete immune response.