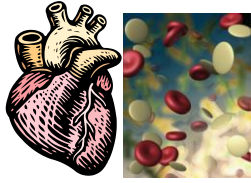


# Bio& 242, Unit 3 Study Guide

## CARDIOVASCULAR SYSTEM

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### CHAPTER 18: THE BLOOD

#### BLOOD CELLS:

##### **Erythrocytes**

**Leukocytes:** Monocytes, Basophils, Lymphocytes, Eosinophils, Neutrophils

##### **Thrombocytes**

**Slide #46 Human Blood Smear:** Be able to identify all the cellular components of blood which are listed above

- 1.) Know the normal components of adult blood. Percentage of blood plasma, formed elements, water, proteins and other solutes.
- 2.) Know the various blood cells. Know normal values for hematocrit, differential white blood cell count, function of the various white blood cells and the significance of elevated or depressed white blood cell counts, and normal RBC and platelet count.
- 3.) Understand the process of hemopoiesis including the following cells: hemocytoblast (pluripotent stem cell),  
**STEM CELLS:** proerythroblast, myeloblast, monoblast, lymphoblast, megakaryoblast;  
**MATURE CELLS:** erythrocytes, eosinophils, neutrophils, basophils, monocytes, B and T-lymphocytes, thrombocytes, macrophage, plasma cell; and the hormones that regulate their development (erythropoietin), thrombopoietin, cytokines.  
**IMMATURE CELLS:** band cell, reticulocytes.
- 4.) Understand the destruction of RBC's and the recycling of, or waste removal of hemoglobin components.
- 5.) Know the steps in blood vessel repair and hemostatic response to stop or reduce blood loss: vascular spasm, platelet plug formation (platelet adhesion, platelet aggregation, platelet plug), and blood clotting (both intrinsic and extrinsic pathways and the common pathway).
- 6.) Understand ABO blood groups and blood typing. Know antigens (AKA isoantigens or agglutinogens) and antibodies (AKA isoantibodies or agglutinins) for all blood types.

- 7.) Understand the following medical terms and disorders: Aplastic Anemia, Blood loss Anemia, Embolus, Erythroblastosis Fetalis, Hemolytic Anemia, Hemophilia (A, B,C, D), Hypervolemic, hypovolemic, iron-deficiency anemia, jaundice, leukemia, leukocytosis, leukopenia, Microcytic Hypochromic Anemia, pernicious anemia, Physiologic Polycythemia, Polycythemia Vera, sickle-cell anemia, thrombocytopenia, thrombus, septicemia.

## **CHAPTER 19: THE HEART**

- 1.) Know the conduction and pacemaker system: SA node, AV node, bundle of His, right and left bundle branches, Purkinje fibers.
- 2.) Know the histology of cardiac muscle cells. Review slides for nucleus, intercalated disc, branches, striations, gap junctions and desmosomes.
- 3.) Understand the physiology of cardiac muscle contractions: voltage-gated fast  $\text{Na}^+$  channels, rapid depolarization, plateau, voltage-gated slow  $\text{Ca}^{2+}$  channels, repolarization, voltage-gated slow  $\text{K}^+$  channels, refractory period.
- 4.) Understand the parts of an EKG and be able to identify the actions of the heart with each EKG wave pattern: P wave, QRS wave, T wave, atrial and ventricular depolarization, atrial and ventricular repolarization, P-Q interval, S-T segment, Q-T interval, isovolumetric relaxation, end-diastolic volume, rapid ventricular filling, diastasis, atrial systole, ventricular systole, isovolumetric contraction, ventricular ejection, end systolic volume (ESV) and know when AV and semilunar valves are open or closed.
- 5.) Know the heart sounds and what causes them. Also know abnormal heart sounds: murmur and mitral valve prolapse.
- 6.) Know how to calculate cardiac output (CO), stroke volume, heart rate, and cardiac reserve. Know the factors that increase or decrease CO..
- 7.) Understand the regulation of heart rate: cardiovascular center, atrial reflex, chemoreceptors, baroreceptors, cardiac accelerator center, vagus (X) nerves.
- 8.) Know the following disorders and medical terms: angina pectoris, angioplasty, bradycardia, tachycardia, cardiac arrhythmias, cardiac tamponade, carditis, coronary artery disease (CAD), coronary ischemia, myocardial infarction, coronary thrombosis, pericarditis, electrocardiogram,
- 9.) Understand the factors that regulate stroke volume (preload, contractility and afterload), and know the Frank-Starling law of the heart.

## **CHAPTER 20: BLOOD VESSELS AND HEMODYNAMICS**

- 1.) Understand the organization of the basic layers of the different kind of blood vessels:  
**TUNICA INTERNA:** Endothelium, Basement membrane, Internal elastic lamina.

**TUNICA MEDIA:** Smooth muscle, external elastic lamina

**TUNICA EXTERNA:** Dense irregular connective tissue

- 2.) Know the various types of arteries, capillaries and veins. Know what anastomoses are.
- 3.) Understand the process of capillary exchange, diffusion, filtration, reabsorption, CHP, BP, IHP, BCOP, ICOP, NFP. Know how to calculate net filtration rate (NFP).
- 4.) Understand the physiology of circulation/hemodynamics. Blood pressure and factors that affect it: resistance/systemic vascular resistance, blood viscosity, total peripheral resistance, blood vessel length and radius, venous return, turbulence.
- 5.) Understand the measurement of and values for blood pressure: sphygmomanometer, systolic pressure, diastolic pressure, Korotkoff sounds, pulse pressure. .
- 6.) Understand nervous, hormonal, and autoregulation of blood pressure: cardiovascular center, accelerator nerves, vasomotor nerves, vagus nerves, baroreceptors, carotid sinus, carotid bodies, aortic sinuses and reflex, atrial reflex, epinephrine and norepinephrine, ADH (vasopressin), and atrial natriuretic peptide (ANP).
- 7.) Understand shock and homeostasis of the cardiovascular system. Know the four types of shock.
- 8.) Be familiar with fetal circulation and the following structures: ductus arteriosus, foramen ovale, ductus venosus, umbilical vein, and umbilical arteries.
- 9.) Be familiar with the following clinical terminology: anastomoses, auscultation, atherosclerosis, arteriosclerosis, Korotkoff sounds, aneurysm, edema, hypertension, hypotension, pulmonary embolism, sphygmomanometer, thrombus, varicose veins.

## **Chapter 21: THE LYMPHATIC SYSTEM**

- 1.) Know the basic structure involved in lymphatic circulation, (and be able to find them on the charts and models in the lab): lacteals, thoracic duct, right lymphatic duct, thymus, spleen, cisterna chyli, axillary nodes, inguinal nodes, cervical nodes and iliac nodes.  
**Other Lymphatic Organs:** spleen and thymus.
- 2.) Know the structure of a lymph node: capsule, trabeculae, cortex, follicles, lymphocytes (T-cells & B-cells), macrophages, follicular dendritic cells, germinal center, medulla, medullary cords, afferent vessels, sinuses, efferent vessels, and hilus.
- 3.) Be able to identify the following lymphatic nodules: pharyngeal tonsil (adenoids), palatine tonsils, and lingual tonsils.