

AP2, Lab 1, Part 1 – THE BLOOD

Instructor will give notes: “Intro to the blood”

FORMED ELEMENTS - Identification & Recognition (p. 658 & 659 or 644 & 645)

See also laserdisc images and wall poster to view samples of human blood and identify the formed elements.

ERYTHROCYTES (RBCs)

Shape? _____

Function(s) _____

Life span = 100 – 120 days

THROMBOCYTES (PLATELETS)

Cell fragments that have the tendency to aggregate / agglutinate together at sites of tissue damage and initiate the blood clotting process. Life span = 10 days.

LEUKOCYTES (white blood cells) (WBCs)

- A “mobile army” of cells helping our immune system protect us against microorganisms.
- Life spans range from a few days to many years depending on type of cell.
- NORMAL WBC COUNT = 4,000 - 11,000 /mm³.
 - If >11,000 / mm³ then condition is called **LEUKOCYTOSIS**
 - If < 4,000 / mm³ then condition is called **LEUKOPENIA**

Neutrophils

Shape of nucleus?

Color of granules?

Eosinophils

Shape of nucleus?

Color of granules?

Basophils

Shape of nucleus?

Color of granules?

Lymphocytes

Shape of nucleus?

Size of cell?

Monocytes

Shape of nucleus?

Size of cell?

OYO: Define **LEUKEMIA** and explain the effect of leukemia on WBC numbers and function.

OYO: In acute leukemia the most common causes of death are internal hemorrhage and infections. Why?

Self-quiz: Functions of Leukocytes (WBCs)

Which of the WBCs contain granules in their cytoplasm and are therefore considered “granulocytes?”
After staining, what is the respective color of the granules in each?

Which WBC contains and releases histamine and other chemical mediators of inflammation? _____

Which WBC directly attacks virus-infected cells and tumor cells? _____

Which two WBCs are actively phagocytic? _____ & _____

Which of these two lives longer? _____

Which of these two is actively phagocytic against bacteria? _____

Which WBC produces massive quantities of antibodies as part of your immune response? _____

Which WBC is identified by its multilobed nucleus? _____

Which WBC is identified by having a more or less round nucleus that nearly fills the entire cell? _____

Which two WBCs have bilobed nuclei? _____ & _____

So how do we distinguish between these two? _____

AP2, Lab 1, Part 2 - THE HEART

Instructor will give notes: “Intro to the Heart”

Before you begin you should know:

- Arteries are vessels that carry blood away from the heart. Always.
- Veins are vessels that carry blood toward the heart. Always.
- On models, the color of any vessel, red or blue is determined by whether or not it is carrying oxygen-rich or oxygen-poor blood. Color does not indicate whether it’s an artery or a vein.
- Most arteries will be red and most veins will be blue... except in the pulmonary circulation where the colors are reversed. Can you explain why this is so?

SUPERFICIAL ANATOMY OF THE HEART

Identify each of the following structures on diagrams and on human heart models.

Base of the heart - the upper, broader end of the heart where the vessels enter / exit. The pericardial sac surrounding the heart also attaches here.

Apex of the heart - the lower, more pointed end of the heart.

The Pericardial Sac around the Heart (p. 679 or 662, 663) or there’s a good alternate explanation at: <http://www.daviddarling.info/encyclopedia/P/pericardium.html>

Fibrous Pericardium

Serous Pericardium

Parietal Pericardium (layer)

Visceral Pericardium (layer)

Epicardium - Same as visceral pericardium. Touch the surface of the heart and your touching it.

Pericardial Cavity

****Confirm the accuracy of your identifications of the above with another student who was not in your group. Also confirm with your instructor.**

OYO: Go to www.clevelandclinic.org

Define **Pericarditis** (and name 2 or 3 possible causes)

Define **Cardiac Effusion**

Define /describe **Cardiac Tamponade**

Predict what would happen to CO (cardiac output) and BP (blood pressure) as cardiac tamponade progresses.

In lab find:

Interventricular Sulcus – a surface groove on the anterior side of the heart filled with coronary vessels and fat. It runs diagonally from the top middle to the lower right of the heart. Directly behind this, internally, is the **interventricular septum**. Open the heart. Put a finger in each ventricle and pinch them together. The tissue between your fingers is the interventricular septum.

Coronary Arteries and Veins - those vessels on the surface of the heart often obscured by fat. These are supplying blood flow to and from the actual myocardial muscle cells themselves.

State a brief function for each of the following with an "*". E.g. “carries blood from the pulmonary circuit to the left atrium.” “Carries blood from the _____ to the _____”

* **Pulmonary Trunk & L and R Pulmonary Arteries**

* **L and R Pulmonary Veins**

* **Superior and Inferior Vena Cava**

* **Aorta** - (Where it makes an abrupt turn and descends downward is called the **aortic arch**.)

Brachiocephalic Artery – the 1st vessel branching off of the aortic arch. It carries blood to the right arm and the right side of the neck and head.

Left Common Carotid Artery – the 2nd vessel branching off of the aortic arch. It supplies blood to the left side of the neck and head.

Left Subclavian Artery – the 3rd branch off of the aortic arch. It supplies blood to the left shoulder and arm.

Confirm the accuracy of your identifications of the previous page and above with another student who was not in your group. And also with your instructor.

INTERNAL HEART ANATOMY:

Chambers:

* **Right and Left Atria**

* **Right and Left Ventricles**

Interventricular Septum - “septum” is a generic term for a dividing “wall.” This structure is the wall between the two ventricles. Don’t expect these “walls” to be straight.

Myocardium – Put one finger inside and chamber and another finger outside the chamber and pinch the two fingers together. Most of what is between your fingers is the muscular myocardium. When comparing the *lateral* walls of the L and R ventricles the thickness of the L usually much greater. Why?

Endocardium - the innermost layer of the heart wall. It appears as the inner lining of the chambers. Touch the wall inside any chamber and you’re touching the endocardium.

Atrioventricular Valves (found between each atrium and its respective ventricle)

Describe the function of each valve as “prevents blood from flowing from the _____ back to the _____.”

* **Tricuspid Valve**

* **Mitral (bicuspid) Valve**

(This valve is almost always the culprit when you hear of someone having heart valve problems. Why?)

Semilunar Valves

* Pulmonary Semilunar Valve

* Aortic Semilunar Valve

Chordae Tendineae and Papillary Muscles. (Function?)

Confirm accuracy of your identifications of the heart's internal anatomy with another student who was not in your group. Confirm with your instructor also if you like.

Trace the path of blood pumped through the heart naming each vessel, valve, and chamber encountered beginning with the superior and inferior vena cava and ending with the aorta. (When you can do this from memory on a blank sheet of paper then you know your heart anatomy pretty well.)

Confirm your accuracy with another student or two who was not in your group. Also confirm with your instructor.

Heart Videos worth watching. These are also available as active links on my webpage. You can just click the link rather than type in the address. If typing, addresses are case sensitive.

<http://www.youtube.com/watch?v=D8LK34hoVpU&NR=1>

<http://www.youtube.com/watch?v=AbmWLXpL0Aw&feature=related>

http://www.youtube.com/watch?v=nx-XRC_1n-Q&feature=related

<http://www.youtube.com/watch?v=oHg5ZvrI4NY&NR=1>

http://www.youtube.com/watch?v=r_RQMdqccqc&feature=related

Bonus: Are you an amateur or a professional? “An amateur practices until he gets it right, once. The professional practices over and over and over until he/she never gets it wrong.”