

Class/lab Activity #7 Physiology

Heart Circuits, Mycardiocytes, Blood and Blood Cells

A. In Class Content Exercises: Heart Circuits and the Mycardiocytes

1) List out in order all of the structures discussed in class for the complete journey of a RBC in both circuits of the heart. Start and end from the 2 large vessels that return blood to the RA.

2) Draw an Action Potential for an Autorhythmic Mycardiocyte. Include all labels and values and phases.



- a) How would you describe the 'resting membrane potential' of these cells?
- b) What causes the Depolarization phase? _____.
- c) Is there a hyperpolarization phase for this action potential? Explain.

3) Draw an Action Potential for a Contractile Myocardocyte. Include all labels and values and phases.



- a) What value does the membrane reach at the highest peak of this action potential? _____ mV.
- b) The threshold for action potentials in these cells is _____ mV.
- c) What causes the Depolarization phase? _____.
- d) Describe the refractory periods for this action potential? Explain the main function why it is .

Some Questions about the Heart

1. Which is true of the pulmonary circuit?

- a) Blood O₂ is higher in the pulmonary vein than in pulmonary artery
- b) Blood is pumped in this circuit by the left ventricle.
- c) Resting blood pressure in the pulmonary artery is normally equal to that in the aorta.
- d) The pulmonary veins return blood to the right atrium

2. The second heart sound, described as "dupp" is actually the sound of the

- a) Atria contracting
- b) Ventricles contracting
- c) AV valves closing
- d) Semilunar valves closing

3. The drifting membrane (pacemaker) potential of some myocardocytes is created by which event?

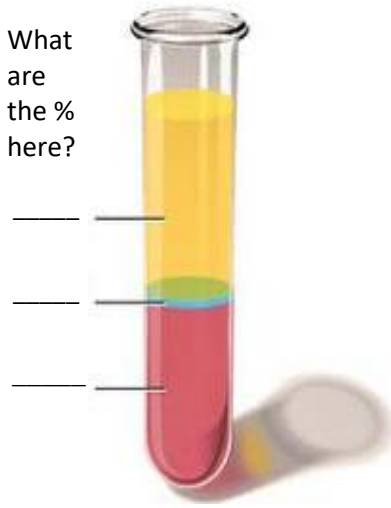
- a) slow Na⁺ influx
- b) rapid K⁺ influx
- c) slow K⁺ efflux
- d) slow Ca²⁺ influx
- e) rapid Na⁺ influx

4. Intercalated discs include these structures for these purposes:

- a) gap junctions to hold tissue together
- b) desmosomes for communication with adjacent cell
- c) interdigitating folds to hold tissue together
- d) gap junctions for communication with adjacent cell
- e) tight junctions and t-tubules to quicken the spread of the action potential.

B. In Class Content Exercises: Blood and Blood Cells

1) Let's look at Blood. Think about all of the Components of Blood and their Functions.



Consider these element below, expand with brief details for each:

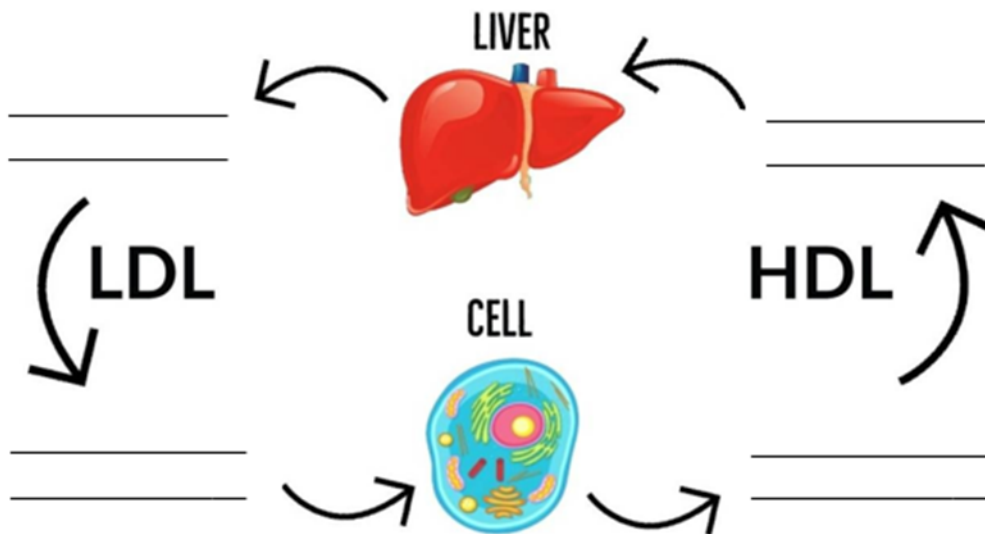
- Plasma
- Gases
- Nutrients
- Wastes
- Plasma Proteins
- Blood Glucose
- Lipids
- Cells
- Other Solutes?
- Color?

2) **Blood Viscosity:** Blood is about _____ more/less viscous than water. What elements contribute to the viscosity of blood?

3) **Define these terms and Conditions:**

- Pernicious Anemia -
- Sickle Cell Anemia -
- Hemorrhagic Anemia -
- Hypoxia -
- Hypoxemia -
- Polycythemia -

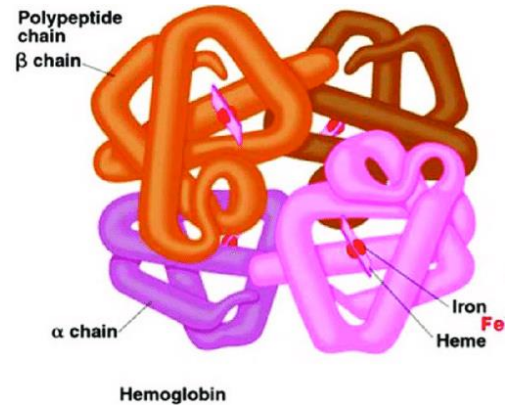
4) Lipids in Blood need carriers! Describe this diagram in terms of lipid transport.



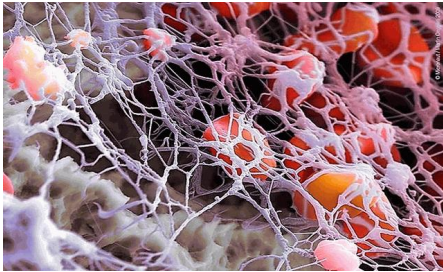
5) The Red Blood Cell. Describes why all of its structures and qualities are PERFECT for its Function.



6) What is the primary thing (molecule) the RBC contains? It is shown to the right). Describe it.

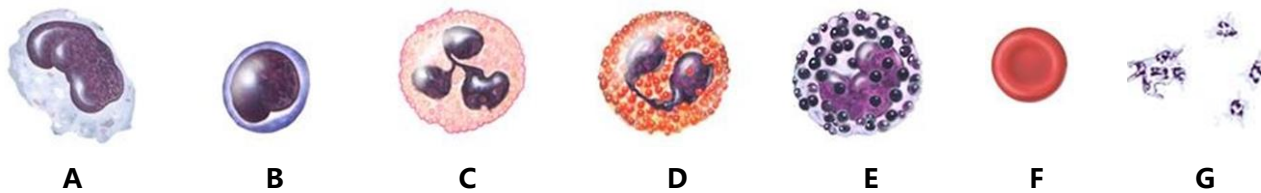


7) What does this image below show? (Hint: Translate 'stopping blood'). In general, why did this occur?



List and briefly describe the **3 Steps** involved in this process:

8) What are the different Blood Cells?



Name the Blood Cells shown above by their letters, and briefly state what they do.

- A
- B
- C
- D
- E
- F
- G

Some Questions about Blood

1. Which of the following statements best describes the role of **high density lipoproteins** (HDL's)?
a) deposits lipids in blood vessel walls **b)** carries and removes cholesterol from the body tissue
c) it's the bad cholesterol **d)** carries and delivers cholesterol to body tissues **e)** it's the good cholesterol

2. Which of the following is **true** about blood?
a) at rest there is more blood in the arterial system than in the venous system
b) arterial blood is more acidic than venous blood **c)** hematocrit for males and females is about the same
d) at higher altitudes, there will naturally be lower hematocrit values **e)** none of these are true

3. A patient needs 2 units of packed red blood cells. The patient is typed and cross-matched and they have **A+** blood. You need to be aware of what blood type this patient can receive. Select all that apply!
a) A- **b)** O- **c)** O+ **d)** A+ **e)** AB- **f)** AB+ **g)** B+ Ans = _____

4. Which of the following statements about albumin is true?
a) It draws water out of the blood vessels and into the body's tissues.
b) It is the most abundant plasma protein. **c)** It is produced by specialized leukocytes called plasma cells.
d) It is an enzyme that is inert in the blood until activated.
e) It is a very small protein that can often cross the cell membrane.

5. Of the white blood cells, the _____ are the largest and the _____ are the smallest cells.
1. lymphocytes **2.** eosinophils **3.** basophils **4.** monocytes **5.** neutrophils
a) 4 and 1 **b)** 5 and 2 **c)** 3 and 1 **d)** 1 and 4 **e)** 2 and 5

6. If the walls of a blood vessel are damaged, the vessel _____ in response to the release of _____.
a) dilates; ACh **b)** constricts; NE **c)** contracts; ACh
d) contracts; endothelin **e)** dilates; nitric oxide (NO)

7. Red blood cells
1. have a nucleus **2.** have no mitochondria **3.** have no ribosomes **4.** rely on glycolysis
a) 4 only **b)** 3 and 1 **c)** 3, 4 and 2 **d)** 1, 2, 3 and 4 **e)** 2 and 3

8. Inside RBCs there are ~ _____ million Hb molecules and every second ~ _____ million RBCs are made.
a) 250 and 2.5 **b)** 2.5 and 250 **c)** 25 and 2.5 **d)** 150 and 4 **e)** 250 and 150

9. Serum is
a) usually 100% water **b)** blood without proteins **c)** usually 45% of blood by volume
d) the cellular component of blood **e)** the fluid component of blood without clotting proteins

10. The **myeloblast** cell make or become which of the following cells? Select all that apply!
a) mast cells **b)** monocytes **c)** eosinophils **d)** neutrophils **e)** basophils **f)** lymphocytes
 Ans = _____

11. The process by which all blood cells are formed is called
a) hemocytoblastosis **b)** erythropoiesis **c)** hemopoiesis **d)** leukocytosis **e)** monocytosis

12. Megakaryocytes are derived directly from
a) myeloid stem cells **b)** monoblast **c)** myeloblast **d)** thrombocytes **e)** megakaryoblast