

**MA112 Lab 2**  
**Critical Thinking Questions**  
**Week 4**

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1. Why are red blood cells biconcave? **Answer:** Red blood cells, also known as Erythrocytes, are the most abundant cells in a person's body. Erythrocytes are what puts the *red*, in red blood cells. RBCs whole purpose is to transport oxygen to the body's organs, regulate body temperature, and discard carbon dioxide to the lungs to be exhaled. All this keeps a person up and running. So, to be these little ninja's, they have to be stealthy and form their surroundings, right? RBCs over time and evolution, have had the chance to morph and change into the best possible shape to get their job done quickly and efficiently. The biconcave shape allows the RBCs to flow and bend where it's needed to keep flowing through a person's capillaries. This shape allows maximum surface area required for oxygen absorption. Which in turn, keeps letting you breath.
2. Why is a WBC differential so important when making differential diagnoses? **Answer:** A differential diagnosis is what medical professionals call the list of all possible diseases or conditions that could be causing the symptoms a person is having. So, how does that pertain to a WBC differential? Okay, so, a white blood cell (WBC) count, measures the number of white blood cells in your blood. What makes this so important is that WBC differential determines the percentage of each type of white blood cell present in your blood. A differential can detect immature white blood cells and abnormalities, both of which are signs of potential issues.
3. Why are patients who have relatively normal hemoglobin but a low hematocrit given packed cells rather than whole blood? **Answer:** Hemoglobin is the protein in RBCs that helps transport oxygen. While the Hematocrit is the test that shows how much RBCs are in a person's blood. A patient with a somewhat normal Hgb, but low hct who is receiving packed cells would mean the patient has some form of anemia. Although a patient has a normal hgb, that doesn't mean there are enough of them doing their supposed job. Packed red blood cells, also known as PRBCs or simply "packed cells", are a type of blood replacement product used for blood transfusions. If a patient needs blood, there are multiple types of blood replacements available. A physician will make the choice of what type of blood replacement will be given.
4. What are the essential features of blood cells used in the differentiation of the cells? **Answer:** Cellular differentiation is a very detailed topic. It can be summarized as essentially the process of which young and immature cells grow and evolve into mature, and certain specialized cells. In order for this to become a reality, three major factors come into play. The cell itself, the appearance of its nucleus, and the cytoplasm. Finally, the transcript factor. The transcript factor, after all is said and done, regulates gene expression. Transcription factors are proteins that affect the binding of RNA polymerase to a particular gene on the DNA molecule. This molecule then either promotes or inhibits

their transcription. I really struggled with this question, there was no help in the book, and even less that I could understand online.

5. What is the normal shape of a red blood cell? A white blood cell? **Answer:** It is important to keep in mind that as humans, we have undergone thousands of years of evolution. Just because we are built the way we are now, doesn't mean we were always like this, our cells included. A mature human RBC is Biconcave (dumb-bell shaped). The cell is flexible and assumes a bell shape as it passes through extremely small blood vessels. With this shape it is able to increase the surface area per volume of these microscopic cells. This then allows oxygen and carbon dioxide to diffuse across the RBC's plasma membrane
  
6. Why are capillary punctures used to obtain a blood specimen from geriatric patients? **Answer:** The collection of a capillary blood specimen is often used on newborns as well as geriatric patients. These two groups are most susceptible to blood depletion as well as prone to injury. Geriatric patient's specifically have fragile and sometimes smaller veins. These veins also have a tendency to roll when attempting a venipuncture. When a medical professional does not need a significant amount of blood specimen from a geriatric patient, like with POC test, capillary punctures are ideal.
  
7. Where is the primary site for the production of erythrocytes, granulocytes, and platelets? **Answer:** Erythrocytes are the most common cells in a body, and are responsible for helping with the transport of oxygen. Granulocytes are a WBC that contain proteins that help a body fight off infections that might be present. Platelets are cell fragments responsible for helping blood to clot and prevent bleeding. 60-70% of an adult's red blood cells come from bone marrow. Although when a person is being conceived, the embryo continues to develop, so the hematopoiesis process moves to the liver, the spleen, and bone marrow, and begins producing other types of blood cells. Granulocytes and platelets primary site of production is also from bone marrow, but changes to other places like the liver as they grow older.