

Comparison of Human and Frog Blood

Materials Required:

- 1) A Foldscope® microscope, completely assembled
- 2) A prepared slide of frog blood
- 3) A prepared slide of human blood

Optional Materials:

- 1) A cell phone camera with coupler to allow mounting on the Foldscope.
- 2) A light source to place on the opposite side of the Foldscope to illuminate the slide.

Procedure:

- 1) Place a slide of either frog or human blood in the Foldscope.
- 2) Focus the Foldscope so that you can image the blood cells on the slide.
 - a. If you have a cell phone and light source, mount these on each side of the foldscope and use the cell phone to expand the image.
- 3) Find a good image of a red blood cell.
- 4) Draw picture of the red blood cell, taking care to copy the shape and any color changes you see in the red blood cell.
 - a. If you are using a cell phone camera, take a picture of the red blood cell.
- 5) Once you have either drawn or taken a good picture of a red blood cell, move around the image (or move the slide in the foldscope) to see if you can find any different kinds of cells.
- 6) Remove the slide from the Foldscope and place it back in its holder.
- 7) Place the other slide (frog or human blood) in the Foldscope.
- 8) Repeat steps 2-6 so that you now have a picture or drawing of both frog and human red blood cells.
- 9) Did you see the darker colored body inside the frog red blood cells? This darker body is the cell nucleus in frog red blood cells. The cells on the slide were treated with a stain to make them more visible. Cell nuclei absorb more stain and appear darker. A cell nucleus is required to allow a cell to reproduce by cell division.

Questions:

- 1) Compare your drawings or pictures of frog and human red blood cells. Can you identify at least two differences between frog and human red blood cells?
- 2) How would you describe the shape of human red blood cells?
- 3) How would you describe the shape of frog red blood cells?
- 4) What is the purpose of red blood cells?
- 5) Which type of red blood cell do you think would be more efficient at transporting oxygen? Why?
- 6) Do you know where new red blood cells are made in humans?
- 7) Do you know how new red blood cells are made in frogs?

Answers to Questions:

- 1) Compare your drawings or pictures of frog and human red blood cells. Can you identify at least two differences between frog and human red blood cells?
 - a. Human red blood cells are round and flat, while frog red blood cells are oval shaped.
 - b. Frog red blood cells contain a cell nucleus, while human red blood cells do not.
 - c. Frog red blood cells are larger than human red blood cells (almost 3x larger)
- 2) How would you describe the shape of human red blood cells?
 - a. Round and flat, sort like a lifesaver but without a hole in the middle.
- 3) How would you describe the shape of frog red blood cells?
 - a. Oval and flat.
- 4) What is the purpose of red blood cells?
 - a. To transport oxygen from lungs to cells and carbon dioxide from cells to lungs (to exhale).
- 5) Human red blood cells would be more efficient for transporting oxygen. They do not contain a cell nucleus or other organelles, so they have more room for hemoglobin (that binds oxygen). Human red blood cells are smaller, so they easily move through small capillaries (small blood vessels to transport oxygen to cells).
- 6) Do you know where new red blood cells are made in humans?
 - a. Human red blood cells do not contain a nucleus, so they cannot undergo cell division to create new red blood cells. Human red blood cells are primarily made by bone marrow.
 - b. The spleen can also make red blood cells.
- 7) Do you know how new red blood cells are made in frogs?
 - a. Frog red blood cells contain a nucleus, so they can undergo cell division to create new red blood cells.