Lab 8: The Cell Membrane

Start by setting up the experiment in section III, and then set up the experiment in section II. Complete other parts of the lab while waiting for experiments to finish – keep track of time.

GOALS:
-Predict the movement of solutes based on size and concentration.
-Predict the movement of water/solute under different conditions.
-Be able to explain the purpose, set-up, and results for all four experiments

KEY TERMS:

solute	solvent	dialysis	osmosis
permeable	diffusion	plasma membrane	tonicity
isotonic	hypertonic	hypotonic	turgor pressure
crenation	hymolysis	plasmoysis	extracellular

I. Diffusion:
p. 48: read the bottom paragraph on diffusion (section 4.3 to the end of page)

II. Diffusion across the plasma membrane:

Table 1: Use in place of table 4.3 on page 51

	What we added:	Initial Color	Color after 20 minutes	What does this tell us?
Inside cell				
Outside cell - (extracellular)				

pp. 50-51: Use the following procedure to do the experiment outlined in your manual:

1. Make your cell: (*See figure 4.7 on page 51 for picture of what "cell" should look like*):

1. Close one end of the dialysis tubing by tying string tightly around it.
2. Add starch solution to the open end of the tubing until it is 1/3 full.
3. Add glucose solution to the open end of the tubing until it is 2/3 full.
4. Make sure there is no glucose or starch on the out side of the tube, rinse with distilled water if necessary.
5. Place a rubber band around the open end and a container, leaving some space in the tube.
6. Record the color of your solution *inside the cell* on ***table 1***.

2. Create an extracellular environment:

1. Add Distilled water to the plastic container until it just covers the cell.

3. Test for starch:

~When starch(clear) comes in contact with iodine(light brown) it turns dark blue/black~

1. Add 10 drops of iodine to the water in the container. Iodine tests for starch.

2. Record the color of the *extracellular environment (the outside of the bag)* in **table 1**.
3. Let the container sit for at least 20 minutes.
4. After at least 20 minutes, note the colors of the solutions *inside and outside of the cell*. Fill in ***table 1*** along with your conclusions about the movement of the solutes.

4. Test for glucose (sugar):

~If you add Benedict's reagent(light blue) to a solution and heat it for 5 minutes it turns rust colored/orange if there was sugar in the solution. It will remain light blue if there was no sugar in the solution~

1. Use the dropper at your desk to put 1.5 ml of solution from the outside of your cell into a test tube. Mark your test tube with the pencil at your desk so that you can identify it as yours.
2. Put on your goggles and gloves. Add 5 drops of Benedict's solution to your test tube.
3. Record the color of solution in ***table 2***.
4. Place the test tube in the rack in the hot water bath.
5. After 5 minutes, put goggles and gloves on, and remove your test tube with the tongs.
6. Record your results in ***table 2*** and answer the two questions.

Table 2: Testing for glucose:

Initial color of extracellular solution	Color of extracellular solution after adding Benedict's and heat	What does this tell us?

1. Which solute did not diffuse across the simulated plasma membrane?

2. Why?

<u>III. Osmosis and Tonicity</u>:

p. 52: read the top two sentences on osmosis.
p. 53: read the top section on tonicity
p. 53: Perform the "potato strip" experiment (materials are on the front bench).

<u>IV. Red Blood Cells (Animal Cells)</u>:

pp.53-54: Follow procedures, fill in table and answer questions (materials are on the back bench).
-View the demonstration slides of red blood cells in hypertonic and hypotonic solutions. Note the differences.

<u>V. Plant Cells (Elodea)</u>:

-pp.54-55: Follow procedures, fill in table and answer questions.

<u>VI. Review</u>:

-p. 58: Answer review questions 8 – 13.