

Osmosis Diffusion Lab

Biology

PART I: Modeling Diffusion Across A Membrane

You will use a baggie as a model of a cell membrane. Other materials you will have available:

- ✓ Starch solution
- ✓ Glucose solution
- ✓ Iodine solution
- ✓ Water

1. In this part you must use what you learned about chemistry and biomolecules in the last unit (you might want to draw the chemical structure of the molecules and look at their relative size.) Hypothesize as to which of the solutions will pass through the “membrane” and which won’t pass through the membrane. Use evidence to support your hypothesis--remember, a hypothesis is NOT a guess!
2. Have the teacher initial your hypothesis.
3. With your group, plan an experiment to test your hypothesis. Be very specific about the steps of the procedure.
4. Run your experiment. Collect the data in table format AND in drawings. Include “BEFORE” and “AFTER” drawings. (While you wait for results, run PART II)
5. Was your hypothesis supported or not? Explain.

PART II: Observing the Effects of Osmosis on Plant Cells

1. Prepare a slide of Elodea (just like in the cell observation lab).
2. While focused on 100X, diagram 2 or 3 cells. Label the following in your diagram: cell wall, nucleus, chloroplasts. Label the diagram with a descriptive title and magnification.
3. Without taking the slide off of the microscope, add a drop of salt solution to the slide, next to one edge of the cover slip. Place the corner of a paper towel next to the other edge of the cover slip. This will pull the salt solution into contact with the cells. (What property of water enables it to be pulled by the paper towel?)
4. Observe the cells again. Diagram what the cells now look like.
5. Repeat step 3 using plain water rather than salt solution.
6. Observe and diagram the cells again.
7. Describe in words what you observed in both processes.

After Labs:

Use the results from Part I, Part II, and your text to answer the following:

- a. What is the difference between diffusion and osmosis?
- b. How does osmosis and diffusion occur?
- c. Within a cell, when equilibrium is established, does diffusion stop?
- d. Which molecules were able to pass through the membrane model (baggie)? What evidence do you have to support your answer?
- e. Why do you think some molecules could pass through?
- f. Define hypertonic, hypotonic, and isotonic. (FOR BIO I...PROBABLY WOULD USE A FILL IN THE BLANK HERE...For example: when the concentration of solute (or dissolved) molecules is higher outside the cell than inside the cell, the solute can be described as _____ . When....)
- g. Which way will water diffuse fastest when a cell is placed in a hypertonic solution (into the cell or out of the cell?)
- h. When you put the plant cells in a hypertonic solution (added the salt water), what happened to the cell?
- i. When you put the plant cells in pure water, what happened to the cell?
- j. What would happen to a red blood cell if you put it into a 10% salt solution? Use diagrams to illustrate your explanation.
- k. When you get an IV in the hospital, the solution they start you off with is either a dilute sugar water or a dilute salt solution. What might happen to some of your red blood cells if they used plain water instead?
- l. If you eat a lot of salty foods, you feel thirsty. The sensation of thirst is a response from your body that your cells need more water. Explain why your cells need more water. Use osmosis in your answer.