Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_

**Diffusion Virtual Lab**

**http://www.glencoe.com/sites/common\_assets/science/virtual\_labs/LS03/LS03.html**

**Background information:**

A **cell membrane** permits some materials to pass through while keeping other materials out. Such a membrane is called “**selectively permeable**.” Under normal conditions, water constantly passes in and out of this membrane.

This diffusion of water through a selectively permeable membrane is called **osmosis**. Like other substances, water **diffuses** from an area of higher concentration to an area of lower concentration. When the movement of water

molecules in and out of a cell reaches the same rate, a state of **equilibrium** is reached.

If the concentration of water molecules is greater outside a cell, then the solution is **hypotonic** to the cell. Water will move into the cell by osmosis. The pressure against the inside of the cell membrane will steadily increase. If the pressure becomes great enough, the cell membrane will burst.

A solution is **isotonic** to the inside of the cell when there is the same concentration of water molecules on the inside and outside of the cell membrane. To maintain equilibrium, water molecules move into and out of the cell at the same rate.

Suppose a living cell is placed in a solution that has a higher salt concentration than the cell has. Such a solution is **hypertonic** to the cell, because there are more salt ions and fewer water molecules per unit volume outside the cell than inside. Water will move from the area of higher water concentration (inside the cell) to the area of lower water concentration (outside the cell). The selectively permeable membrane does not allow salt ions to pass into the cell. The cell shrinks as the cell loses water.

**Objectives:**

Describe the process of osmosis

Observe the movement of water through cell membranes during the process of osmosis

Compare and contrast three osmotic states: *hypotonic, isotonic*, and *hypertonic*

**Data Table**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Red Blood Cell | | Cell of Elodea (aquatic plant) | | Paramecium | |
|  | Net movement of water In or Out? | Appearance of cell (describe or draw) | Net movement of water In or Out? | Appearance of cell (describe or draw) | Net movement of water In or Out? | Appearance of cell  (describe or draw) |
| Hypotonic Solution |  |  |  |  |  |  |
| Isotonic Solution |  |  |  |  |  |  |
| Hypertonic Solution |  |  |  |  |  |  |

**Analysis:**

1. Did water move into or out of the cell while it was surrounded by a hypotonic solution?
2. Did water move into or out of the cell while it was surrounded by a hypertonic solution?
3. Did water move into or out of the cell while it was surrounded by a isotonic solution?
4. Compare and contrast what happens to an animal, a plant, and a paramecium cell in a hypotonic, hypertonic, and isotonic solution.
5. Could Elodea or paramecium from a freshwater lake be expected to survive in transferred to a salt water environment, like the ocean? Explain.
6. An effective way to kill weeds is to pour salt water on the ground around the plants. Explain why the weeds die, using the principles discovered in the virtual lab.
7. If you grill a steak, would it be better to put salt on it before or after you cooked it? Explain in terms of osmosis.
8. Why does salad become soggy and wilted when the dressing has been on it for a while? Explain in terms of osmosis.
9. How is osmosis similar to diffusion?
10. What TWO things are necessary for osmosis to occur?
11. Give TWO examples (other than *cell membrane*) of a selectively permeable membrane.