

Laboratory Investigation 4A

Chapter 4: Cell Structure

Cell Structure: Osmosis

You may refer to pages 63-65, 68-69 in your textbook for a general discussion of the cell membrane and osmosis.

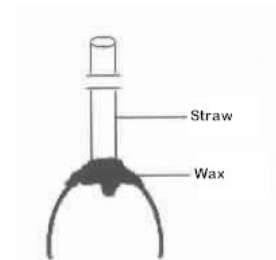
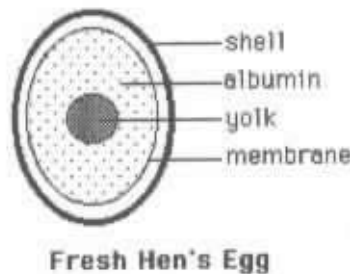
Time required: 90 minutes

Goal

examine the dynamics of concentration gradients and diffusion with a simple egg osmometer.

Materials:

- fresh egg
- drinking straws
- candle & matches
- distilled water
- 50 ml beaker



Procedure:

1. Prepare a fresh hen's egg by gently tapping on the shell at the bottom end with a blunt instrument to crack the shell without damaging the underlying shell membranes.
2. Remove the shell fragments (about the size of a quarter), but do not remove or tear the membrane. Allow the contents of the egg to remain undisturbed.
3. At the top end of the egg, remove a small portion of the shell (enough for the straw to fit through) and puncture a tiny hole in the membrane, as well. Allow the contents of the egg to stay inside the egg.
4. Insert a plastic drinking straw into the top of the egg through the hole in the membrane.
5. Seal the straw into position with hot wax (drippings from the wax candle), being certain the seal does not leak. Put some food coloring down the straw. Using a wax pencil or a piece of tape, mark the level of food coloring in the tube.
6. Set the membrane end of the egg in a 50 ml beaker of distilled water. Add more water through the beaker's spout from time to time as needed. Be sure the water covers the membrane at all times.

Observations:

1. Check your osmometer frequently over the next twenty-four hour period. Each time you check it, record the time and measure the height of any fluid in the straw. Add more water as needed. Every ten minutes, record the level of food coloring in the tube. Continue these observations as long as your class lasts.

10 minutes: _____

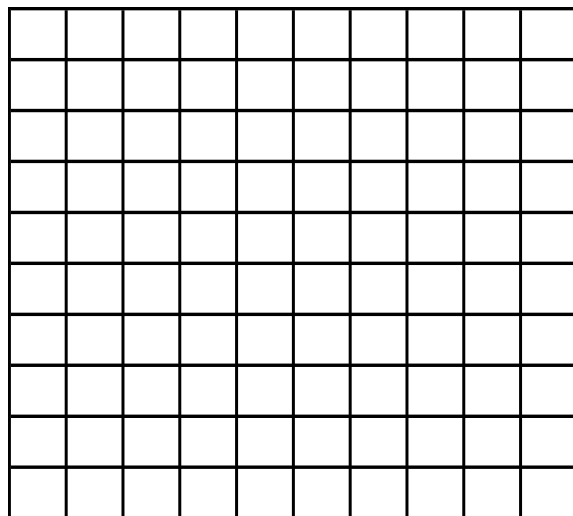
20 minutes: _____

30 minutes: _____

40 minutes: _____

24 hours: _____

2. Make a graph of fluid rise over time.



Summing up

1. What is diffusion?

2. What is osmosis?

3. What caused the level of food coloring to rise in the straw?

4. If you left this apparatus set up for a long period of time, would the action you observed

continue indefinitely or come to a stop?

Why?
