

Cell-to-Cell

DEMONSTRATION LAB

KEY QUESTION: Is there an exchange of chemical information between cells?

PURPOSE: To determine if one cell has an effect on the conditions of an adjacent cell. This is a simple representation of cell-to-cell transfer of information with diffusion through two membranes.

MATERIALS: Each team of three needs these items

- One container, with lid, for your “cells” (We’ll use large petri-dishes.)
- Four pieces of dialysis tubing, each one should be 6-inches long. Soak these in tap water for 2-3 minutes before attempting to tie them off.
- 1 percent starch solution – about 100 ml in a beaker
- Diluted Lugol’s solution – about 100 ml in a beaker
- Distilled water – just use from the jug/dispenser when ready
- a pipette for Lugol’s and a pipette for Starch solution

PROCEDURE:

Tie off one end of each end of the dialysis tubing.

Place enough distilled water in the petri dish to cover the bottom. You don’t need to cover your “cells”.

Fill two pieces of the dialysis tubing with 1 percent starch solution and seal (tie off) the open ends.

Fill the remaining two pieces of dialysis tubing with the diluted Lugol’s solution and seal the open ends.

Place the completed tubing into the petri dishes, alternating first with Lugol’s-filled tubing and then a starch-filled tube, then another Lugol’s-filled tube, and the last starch-filled tube. The tubes should be touching as much as possible – complete contact down the sides is ideal. Obviously the outer tubes will only be touching one other tube.

Place the lid on your petri dish to help keep the tubing moist, just as cells are moist at all times.

Make observations every 5 minutes to observe any changes in the tubes. Are there any color changes?

ANALYSIS: Answer each of these in complete sentences, in your lab book.

1. Explain why it was important to keep the system moist.
2. Were there color changes in any of the tubes? If so, what do these changes indicate?
3. Compare and contrast (what is the same, what is different) the dialysis tubing bags in contact with each other to cells that are in contact with each other.
4. The dialysis tubing bags serve as a model for a community of living cells. In what ways is the model an accurate portrayal of cell systems and in what ways is it flawed?
5. Describe two specific examples of cell-to-cell communication, naming the type of cell and what chemical message is passed. Use your textbook for ideas if you need to.