

# Structure and Function in Plant and Animal Cell Osmosis

## Overview

In this series of activities, you will prepare two microscope slides: one of animal cells and another of plant cells. First, you will identify the major structures in each type of cell under normal conditions. Then, you will observe the effect that an outward osmotic flow of water has on each cell type and draw conclusions about the functions of animal and plant cell structures.

### Materials

- Red Onion Skin
- Toothpicks
- Microscope Slides
- Coverslips
- Microscope
- Saline (NaCl) Solution (20%)
- Deionized Water
- Methylene Blue
- Pipets

### Background

Diffusion is the net movement of molecules from a region of their higher concentration to a region of their lower concentration. Osmosis is the diffusion of water molecules across a permeable barrier, such as the cell membrane of an animal cell or plant cell. The cell membrane of plant cells is surrounded by a rigid cell wall. When exposed to a 20% saline solution, water inside plant and animal cells is drawn out. The structure and function of each cell type influences the outcome of this change in environmental conditions.

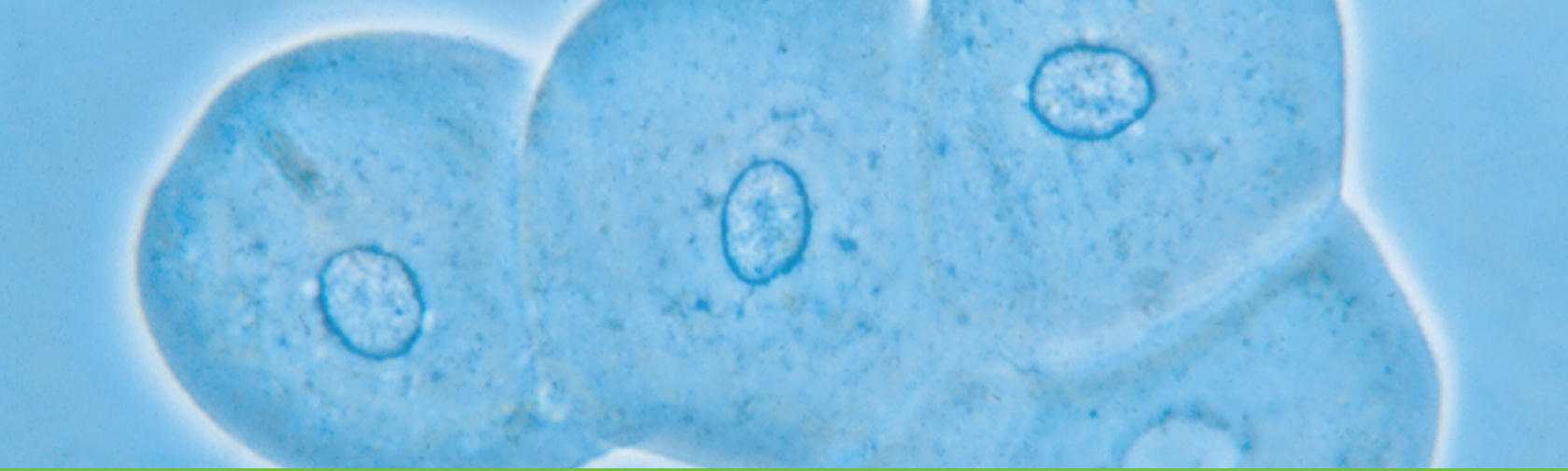
## Procedures

### Activity 1A: Animal Cells Slide (Human Cheek Cells)

1. Gently scrape the inside of your cheek with a clean toothpick.
2. Use a pipet to place 1 drop of deionized water onto a clean microscope slide.
3. Add 1 drop of methylene blue to the water on the slide.
4. Use the toothpick to mix the methylene blue and water on the slide.
5. Gently place a coverslip over the cell sample on the slide.
6. Observe the structures of the cells on the slide.
7. Draw several cells and label the structures that you can identify.

### Activity 1B: Plant Cells Slide (Onion Skin Cells)

1. Obtain a thin slice of onion skin.
2. Use a pipet to place 1 drop of deionized water on a clean microscope slide.
3. Place the onion skin in the water droplet on the slide.
4. Gently place a coverslip over the cell sample on the slide.
5. Observe the structures of the cells on the slide.
6. Draw several cells and label the structures that you can identify.



## Procedures (continued)

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### Activity 2

1. Add 3 drops of 20% saline solution to the edge of the coverslip on your cheek cells slide.
  2. Add 3 drops of 20% saline solution to the edge of the coverslip on your onion cells slide.
  3. Allow both slides to sit undisturbed for 2 minutes, to give the saline solution time to mix with the deionized water surrounding the cell samples.
  4. Observe the cheek cells and the onion cells again.
  5. Draw several plant cells and label the structures that you can identify.
  6. Draw several animal cells and label the structures that you can identify.
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### Questions

1. What effect did the saline solution have on the cheek cells? What effect did the saline solution have on the onion cells?
2. What conditions and processes caused the changes that you observed in the cells?
3. On the basis of your observations, what can you infer about the function of a cell membrane?
4. On the basis of your observations, what is one function of the cell wall of plant cells?

### Extension Activities

1. Compare and contrast the organelle systems of plant cells and animal cells.
2. Compare and contrast the organ systems of plants and animals.