

Observing Plasmolysis in Elodea Through Digital Microscopy

INTRODUCTION

All forms of life are composed of only two fundamentally different types of cells. The first type, which include the bacteria and archaeans, is called prokaryotic, Greek for "before the nucleus". The second type of cell, which almost certainly evolved from the prokaryotic cell and makes up the bodies of protists, plants, fungi, and animals, is called eukaryotic, for "true nucleus". Eukaryotic cells contain a more complex internal structure that consists of many organelles that perform specific functions within the cell. All eukaryotic cells have an elaborate system of membranes that enclose the cell and create internal compartments that allow a huge variety of processes to occur within the cytoplasm. This membrane is composed of the plasma membrane and several other organelles. The plasma membrane both isolates the cell and allows selective interactions between the cell and its environment. Plant cells also contain chloroplasts, which can capture energy directly from sunlight and store it in sugar molecules. In this exercise you will observe both normal plant cells and plasmolyzed plant cells observing changes in the internal structure of the cell.

OBJECTIVES

In this experiment, the student will:

- Demonstrate proper microscope techniques.
- Practice handling and using a microscope.
- Use a computer and software to create images.
- Capture a still image and manipulate editing functions.
- Create a video of an observed organism and play it back.
- Save still images and videos to disc.

Materials:

Digital compound microscope
Laptop
Floppy disk
Slide and cover slip
Kim wipes or paper towel

Elodea
Dropper
6% Salt Solution
Tap water
Forceps

Procedure

Part 1: Creating a wet mount of Elodea

1. Set up microscope and laptop computer.
2. Prepare a wet mount of an Elodea leaf.
3. Place wet mount on microscope stage. Focus on low, medium, and high power.

Part 2: Saving a still image of normal Elodea cells

1. On your desktop, click on: Motic icon, then File, and then Capture Still Image.
2. Make sure that the image to be saved is in focus on the computer screen.
3. Click on Capture Still Image.
4. Click on the Painter icon in toolbar.
5. Click on Text tab.
6. Type, "Normal Elodea Cells" in the text box. Choose your font, size, etc... and click on add. You may move your text *around with the hand on the text box*.
7. Go to: File, Save as, floppy A drive. Name and save your image onto a floppy disk as a jpg file.

Part 3: Creating a video image of cytoplasmic streaming

1. Allow your Elodea leaf to warm up on the microscope stage. Observe the chloroplast within the cells of the leaf.
2. When you begin to see the chloroplast begin to move around the periphery of the cell (cytoplasmic streaming), prepare to record a video.
3. Click on: Measure in the toolbar, then Calibration, Capture Immediately, Capture, Video. In Video Sequence, click OK. Name your video, "Cytoplasmic Streaming" (you may need a separate floppy disk for you video). *Video will begin recording image.*

Part 4: Plasmolysis of Elodea cells

1. Add a drop of 6% salt solution to one side of the Elodea wet mount and draw solution through with a paper towel touching the opposite side.
2. Observe the leaf under low, medium and high power. Note the location of the chloroplast in relation to the cell.
3. Follow steps from part 2 and save an image of plasmolyzed Elodea cells. Save the image as, "Plasmolyzed Elodea Cells".

ANALYSIS/CONCLUSIONS

1. How is digital microscopy beneficial in the field of Science?
2. What effect did salt have on cell size? Explain.
3. What is a chloroplast? Why is it important to the cell?

