

Observing Cork Cells and Onion Cells

Lab

Background

Over 300 years ago, Robert Hooke, an English scientist, described the appearance of cork under the microscope. He named the tiny, box-like structures he observed *cells*. Cork, which does not contain living tissue, comes from the outer bark of the cork oak tree.

By the early part of the 19th century, it was accepted that all living things are composed of cells. Cells come in a variety of shapes and sizes, and they perform different functions. Although cells are different, they resemble one another because they share certain common structures. The microscope reveals that most plant cells and animal cells have various components including the *nucleus*, *nucleolus*, *mitochondria*, *cytoplasm*, and *cell membrane*. An understanding of the cell is essential to the study of biology.

Objectives

In this activity you will:

1. Observe the structure of dead cork cells.
2. Observe the structure of living onion cells.
3. Apply your knowledge of the operation of a microscope.

Materials

microscope	cork stopper
slides	onion
cover slips	forceps
single-edged razor blade	Lugol's iodine solution in
medicine dropper	dropper bottle
water	paper towels

Procedures and Observations

PART I. CORK CELLS _____

To observe cork cells under a microscope, you must slice very thin sections of cork.



1. Place the cork on a paper towel or on several sheets of paper. Hold the cork firmly and shave a thin section from the cork with a razor blade. The slice must be paper-thin. This procedure is shown in Figure 1. **CAUTION:** *Razor blades are sharp! To avoid cutting your fingers, slice away from them, not toward them.*

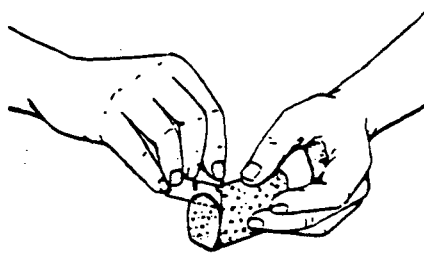
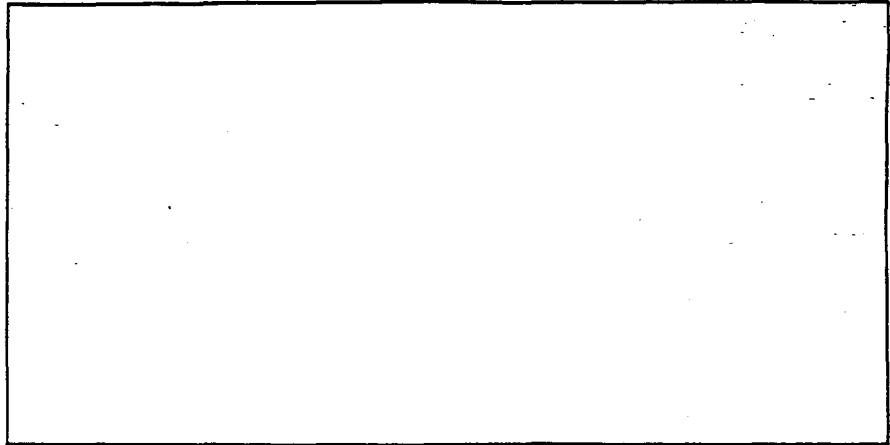


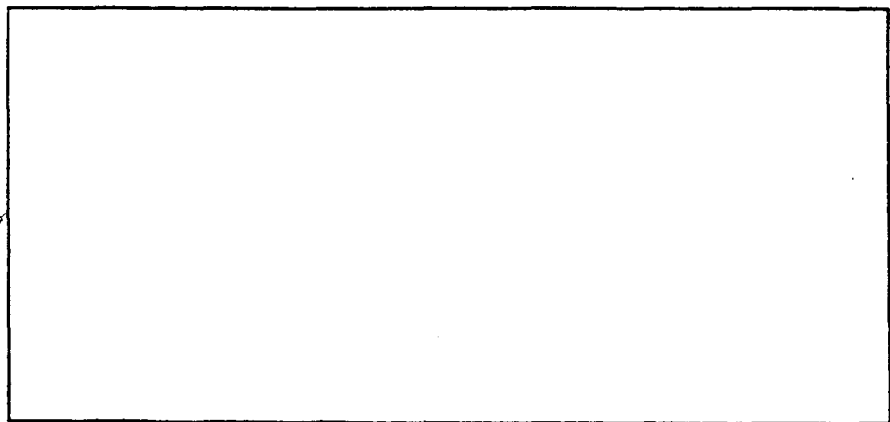
Figure 1

2. When you have cut a slice thin enough for light to pass through it, prepare a wet mount. Place the cork slice in a small drop of water on a slide. Add another drop on top of the cork. Then cover it with a cover slip.
3. Examine the cork under low power. The best place to look is along the thinnest edge of the slice.
 - a. *Make a drawing of what you see under low power.*



4. Examine the cork under high power.
 - b. *Describe the general shape of cork cells.*

- c. *Draw several cork cells as they appear under high power and label the cell wall.*



Observing Cork Cells and Onion Cells (continued)

d. What structures do you see within the cell walls? Explain.

PART II. ONION EPIDERMAL CELLS

1. Cut an onion bulb into quarters.
2. Take an inner layer of the onion and, with a razor blade, cut several 1/2-cm squares through the paper-thin epidermis lining the leaf. Then, with a forceps, remove one of the squares of epidermal tissue. Place it in a drop of water on a slide. Add a cover slip. This procedure is shown in Figure 2.

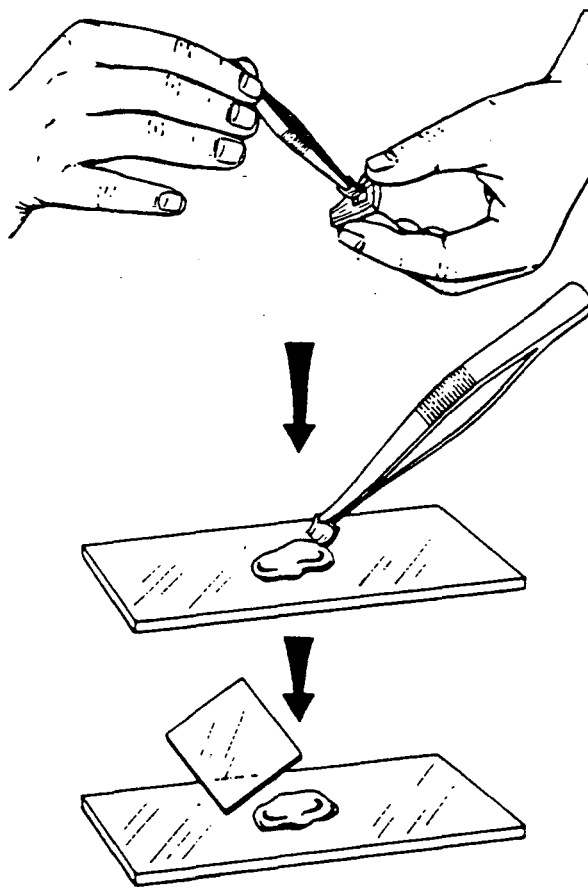


Figure 2

3. Examine the wet mount under low power. Adjust the light to provide the best contrast.
 - a. What is the shape of the cells?
- _____

Analysis and Interpretations

1. How can you tell that cork cells are nonliving?

2. When Robert Hooke examined cork with his microscope, what did he really see?

3. Explain why cork floats on water. (Hint: What do the cork cells contain?)

4. What structures did you see in onion cells that you did not see in cork cells? What structures did you see in both?

5. What is the advantage of using stain?

6. How can you tell that an onion cell has depth?

For Further Investigation

1. Prepare a list of the plant cell parts that you have seen in this lab. Use your text to write about the function of each part.

2. Determine the length, width, and height of an average cork cell. What is its volume?



3. Collect other plant cells (leaves, vegetables, tree bark, etc.) to observe under the microscope. Make drawings of each and label the parts you can identify. List the structures that all the cells seem to have in common.