

## Observing the Differences between Plant and Animal Cells

### Purpose:

To define the differences between plant and animal cells.

### Hypothesis:

It is hypothesized that there will be a chloroplast visible in only the plant cells because the plant cells require a chloroplast to produce food. The plant cell will also contain a visible cell wall, which is required for protection and structure. In addition, it is hypothesized that the plant cell will have a larger vacuole than the animal cell because the plant cells contain a great amount of water per cell.

### Materials:

- Light microscope
- Prepared slide of human epithelium
- Prepared slide of onion cells
- Paper, pen, pencil, eraser

### Procedure:

Place the onion slide on the stage and focus with the low-power objective lens. Then, rotate the nose-piece to the medium power objective lens and use the fine-adjustment knob to bring the cells into view. Draw and describe the cells. Switch to low power and remove the slide containing the onion slide.

Place the human epithelium slide on the stage. Using the coarse adjustment on low-power, focus on the cells. Rotate the nose-piece to medium power and focus using the fine-adjustment knob. Explain the difference between the plant and animal cells. Draw and label the cells.

Switch to low power, and put the stage on the lowest level. Remove the slide. Unplug the microscope, and wrap the cord around the arm. Place the cover on the microscope and place it back on the shelf using the arm and the base.

### Observations:

- epithelial cells regular in shape
- animals cells lack structure
- epithelial cells stained purple, onion cells stained brown
- plant cells contain a cell wall
- less nuclei visible on plant slide than animal slide

\*see attached drawings

### Calculations:

Medium power magnification:	
Ocular lens	10x
Objective	<u>10x</u>
Total	<u>100x</u>

High Power magnification:	
Ocular	10x
Objective	<u>40x</u>
Total	<u>400x</u>

**Discussion:**

The plant and animal cell have many differences which allows an observer distinguish between the cell types. It was observed that the plant cell has a more organized arrangement than the animal cells. The plant cells appeared in a regular rectangular pattern; whereas the animal cells appeared to have no regularity or pattern. It was also observed that the plant cells contained a cell wall. The plant cell wall provides the plant with structure and protection. Due to the fact that a plant does not contain a skeleton for structure, the cell wall provides rigidity, and support. The regular shape and presence of the cell wall were the main differences observed between the onion cells and human epithelial cells.

When observing cells, it is important to ensure that the proper preparations have been made to make the cells visible. The onion and epithelial cells were stained, purple and brown respectively, to aid in the visibility of their structures. Despite this preparation, the chloroplast and vacuoles were not visible. This is a limitation of the compound light microscope, as the structures would be visible at higher magnifications. In addition to staining and magnification, proper focus and lighting plays an important role in observing cell structures. Poor lighting or the inability to focus prevents the structures from being properly observed. When observing cells, it is important to ensure that proper stains, magnification, focus and lighting are used.

**Conclusion:**

In conclusion, the onion cells contained a visible cell wall, which is used by the cell for structure and protection. The hypothesis was correct in stating that the cell wall would be visible. The hypothesis was incorrect in stating that the vacuoles and chloroplast would be visible. These structures were too small to be visible under the light microscope.

The sources of error which may have affected the outcome of the experiment included poor focus or lighting which prevents clear observation.