

LAB: PLANT CELLS vs. ANIMAL CELLS

INTRODUCTION

Background Information:

Ever since the first microscope was used, biologists have been interested in studying the cellular organization of all living things. After hundreds of years of observations by many biologists, the cell theory was developed. The cell theory states that the cell is the structural and functional unit of living things. Eukaryotic cells contain structures called organelles that carry out life processes. Eukaryotic cells can be classified by the types of organelles they contain. In plant and animal cells, similarities and differences exist because of varied life functions.

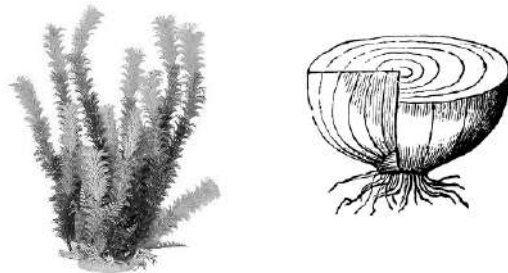
In this investigation, you will compare the structures of 2 typical plant cells, onion (*Allium*) and *Elodea densa* (Anacharis- a common aquarium plant), with a typical animal cell, a cheek cell.

Research Problem: How are plant and animal cells alike and how are they different?

MATERIALS & METHODS

Materials:

microscope, slides, coverslips
cell samples: onion, Elodea, human cheek cells
water and dropper
cell stains: iodine & methylene blue
forceps, toothpicks
lens paper, colored pencils



Methods:

1) Make wet-mount slides of the available cell types. You may do them in any order. Work at your own pace.

REMEMBER:

- Look around on LOW power; go up to MEDIUM or HIGH when you've found something.
- It may take two or three tries at a slide before you get a good preparation!
- Adjust fine focus to see one layer of cells (especially if viewing plant tissue).
- Draw ONLY what you see, and LABEL the structures you recognize!

AVAILABLE CELL TYPES:

Onion

- 1) Remove a scale from the onion.
- 2) Snap the scale in half and peel a thin layer of tissue from its inner surface.
- 3) Make a wet-mount (add 2-3 drops of water) of a piece of this tissue. Smooth out any "wrinkles."
- 4) Put on a cover slip.
- 5) **STAIN with iodine stain**, as demonstrated by the teacher.
- 6) Observe, draw, and label.

Elodea densa

- 1) Tear off one young leaf from the tip of the plant.
- 2) Make a wet-mount of this leaf.
- 3) Put on a cover slip.
- 4) **Do NOT stain.**
- 5) **FOCUS** carefully. Use the fine focus. *Elodea* leaves are two cell layers thick.
- 6) Observe, draw, and label.

Cheek

- 1) With a flat clean toothpick, gently scrape the inside of your mouth. You'll pick up any cheek lining cells, even though you won't be able to see them!
- 2) Smear the toothpick on a slide to spread out the cells and saliva. If too dry, add a TINY drop of water.
- 3) Put on a cover slip.
- 4) **Stain with methylene blue**, as demonstrated by the teacher.
- 5) Observe, draw, and label.

***Prepared Slides: pick 3 additional cell types to sketch and label!
(try to pick a mixture of some plant and some animal cells)***

2) Draw what you see on the data page.

3) Answer the Discussion Questions that follow your cell drawings and observations.

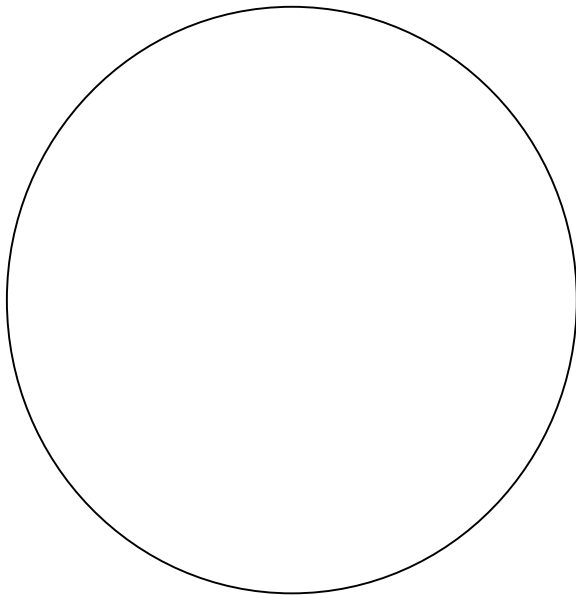
RESULTS

Microscope Observations

*Within the circles below, draw what you see. **Make sure to give each figure:**

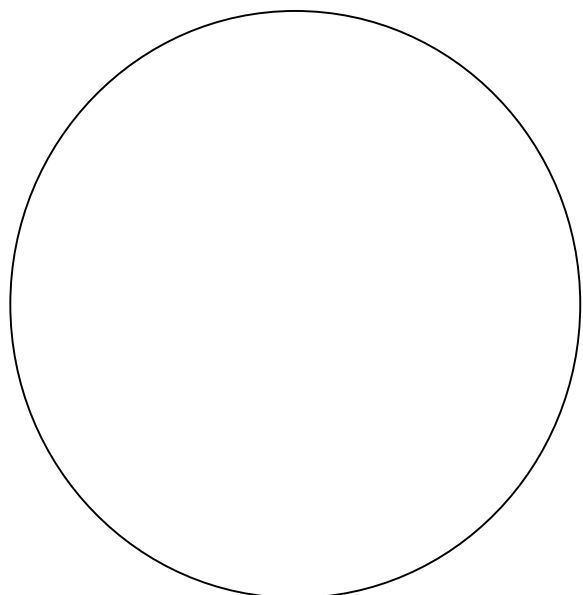
- a number and title (ex: Figure 1: Onion Cell)
- magnification (40x, 100x, or 400x)
- label all visible cell parts
- use colored pencil; **LABEL** AS MUCH AS POSSIBLE!

Figure 1: _____



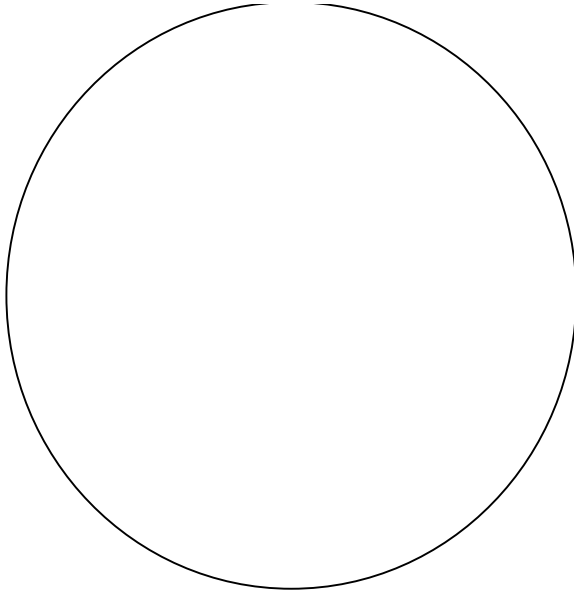
Magnification: _____

Figure 2: _____



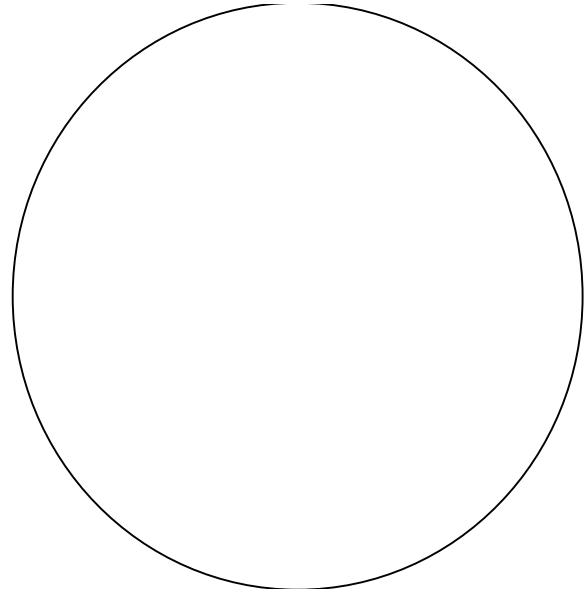
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Figure 3: _____



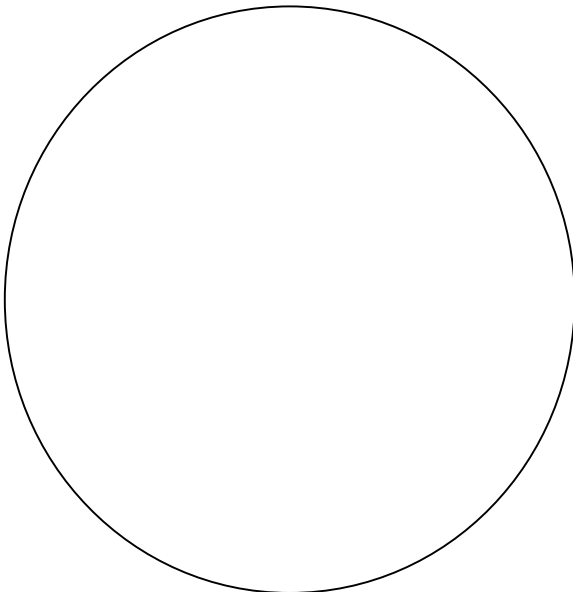
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Figure 4: _____



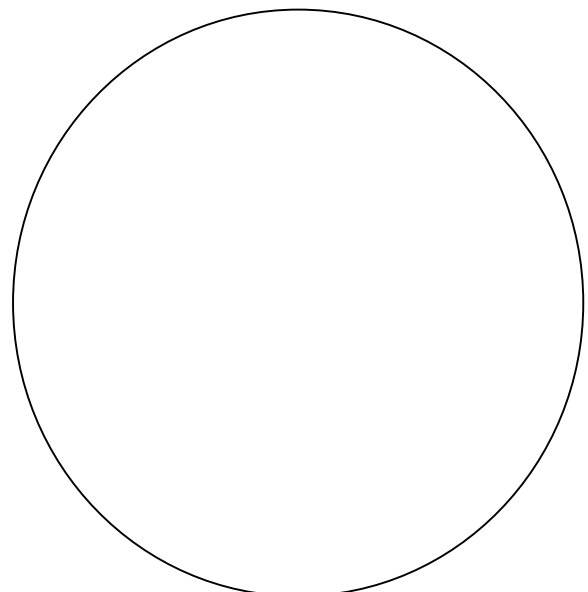
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Figure 5: _____



Magnification: _____

Figure 6: _____



Magnification: _____

Data Table 1: Observations

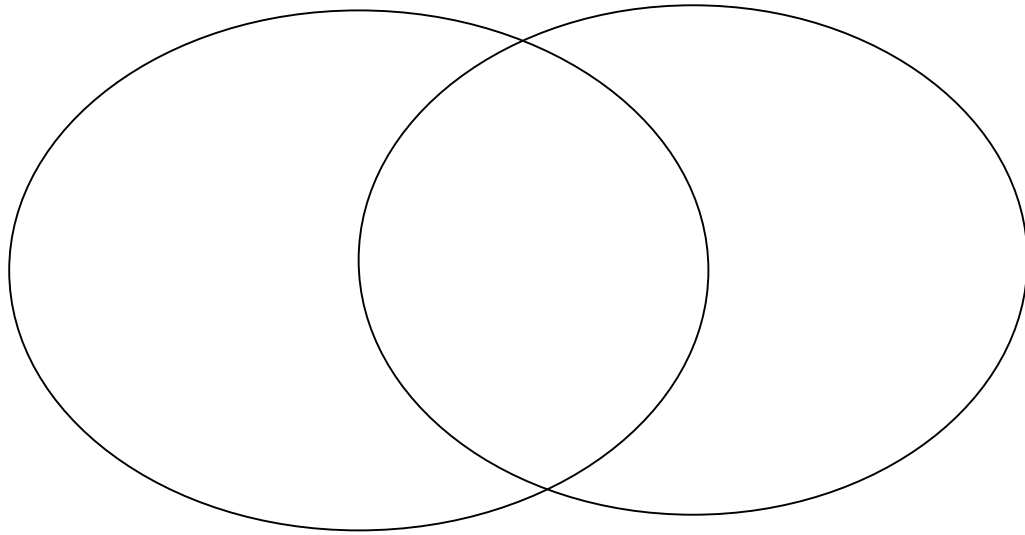
Summarize the cell parts that were visible for each cell type.

Cell Type	Structures Observed
Onion Cells (<i>Allium</i>)	
<i>Elodea densa</i>	
Human cheek cell	

DISCUSSION QUESTIONS

*****You may need to look some of these up in your textbook or online!***

1) Fill in the Venn-Diagram below showing the similarities and differences between plant and animal cell organelles.



2) Why are stains such as methylene blue used when observing cells under the microscope?

3) What is the advantage of using a wet-mount preparation instead of a dry-mount preparation in the study of living cells?

4) If you were given a slide containing living cells of an unknown organism, how would you identify the cells as either plant or animal?

5) A) What is an epithelial cell?

B) Name 2 other places where one could find this cell type in the human body.

6) A) In your leaf slide you may have seen **stomates** (a.k.a. **stomata**). What is the function of these structures?

B) What moves through these structures?

7) A) In a healthy human, approximately how many erythrocytes (red blood cells) would be present in a drop of blood (mm^3)?

B) Most cells contain a nucleus. One exception is mature human red blood cells. How is the structure of the red blood cell an example of "structure fitting function"?