

Examining Cells from the Five Kingdoms

Name: _____ Period: _____

Background: Plants look and behave very differently from insects that might feed on them and from fungi that might grow on their roots. Likewise, different types of single-celled organisms, such as amoebas and bacteria, vary in appearance. Differences in the cells of the organisms ultimately account for these variations. As the functional units of life, however, all cells have common characteristics. For example, every cell is made mainly of cytoplasm enclosed in some sort of membrane. All cells, at some points, also contain genetic material that directs the way the cell functions.

Purpose: In this laboratory you will examine cells representing organisms from each of the five kingdoms by using slides made by yourself and previously prepared slides. You will observe similarities and differences in cell structure and function. You will use a microscope to observe cells and make labeled drawings of each.

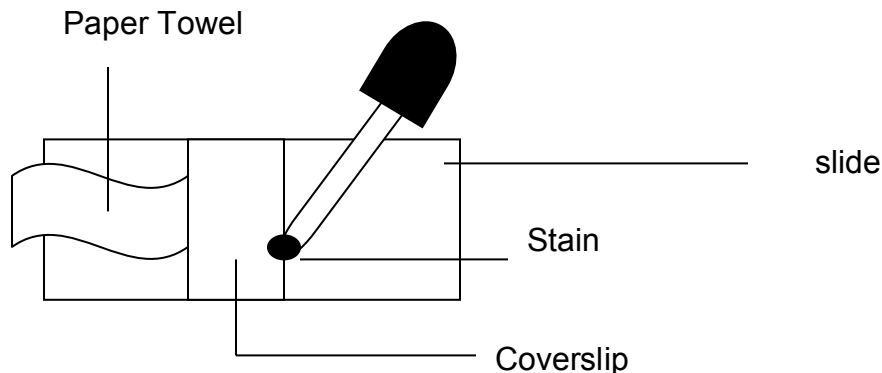
Materials: 3 Microscope slides, medicine dropper, tap water, 3 coverslips, toothpick, paper towels, compound microscope, elodea leaf, yeast suspension, methylene blue stain, iodine solution, prepared slides of animal, plant, fungal, protist and moneran cells.

Predictions: Which type of cell will be the most complex? Which cell will be the simplest? Which cell will be the largest?

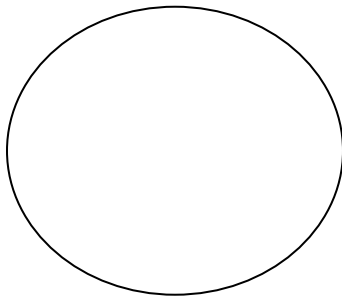
Procedures:

Animal Cells

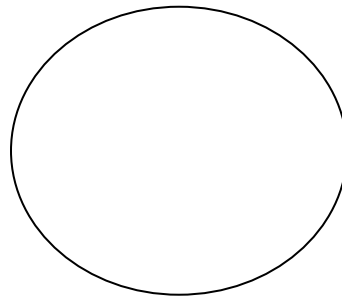
1. Prepare a wet mount slip of tongue cells.
2. Place a drop of water on the center of a clean slide. Use a clean toothpick to gently scrape the top surface of your tongue or inside of your cheek. Mix the scrapings from the toothpick with the water on the slide. Gently lower a coverslip in place over the cells and water mixture.
3. To make sure the cell structures are visible, stain the cells with methylene blue by adding one drop of stain along one side of the coverslip. On the opposite side of the coverslip, place a small piece of paper towel, as shown below. The paper towel draws the stain under the coverslip and across the slide.



4. Observe the stained tongue cells using the low power objective of your microscope. Estimate the length of a tongue/cheek cell in micrometers, and record this data in Table 1.
5. Describe the general shape of the cells also in Table 1.
6. Look for all visible cell structures and in Table 2 check off the ones you observe. Do the same thing under high power. Make sure to check off what you see in the data table.
7. Draw several tongue/cheek cells (under high power) in the circle below. Label all the structures you see.
8. Clean off your slide and obtain a slide of prepared animal cells. Observe under high and low power. Add this cell to Table 2 and check off all visible cell structures.
9. Draw the prepared animal cells in the circle below. Label all the structures you see. Be sure to also record the cell type on the line below the circle (ex. Human bone, dog muscle, cat nerve etc.)

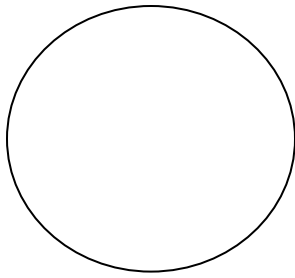


Human cheek/tongue cells

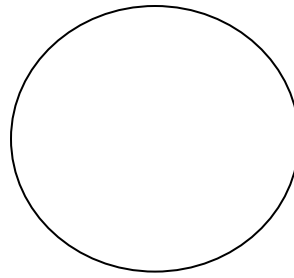


Plant Cells

1. Obtain an *Elodea* plant leaf. Make a wet mount of the leaf cells and stain with iodine solution (see *animal cells procedures*). You may want to look at the slide **without** stain first. If enough structures are visible no stain is needed.
2. Observe the *Elodea* cells using the low power objective of your microscope. Estimate the length of an elodea cell in micrometers, and record this data in Table 1.
3. Describe the general shape of the cells also in Table 1.
4. Look for all visible cell structures and in Table 2 check off the ones you observe. Do the same thing under high power. Make sure to check off what you see in the data table.
5. Draw several *Elodea* cells (under high power) in the circle on the following page. Label all the structures you see.
8. Clean off your slide and obtain a slide of prepared plant cells. Observe under high and low power. Add this cell to Table 2 and check off all visible cell structures.
9. Draw the prepared plant cells in the circle on the following page. Label all the structures you see. Be sure to also record the cell type on the line below the circle (ex. Onion root etc.)

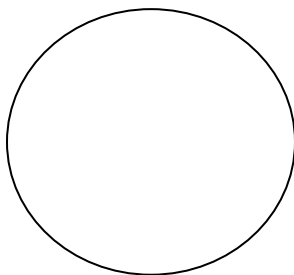


Elodea Cells

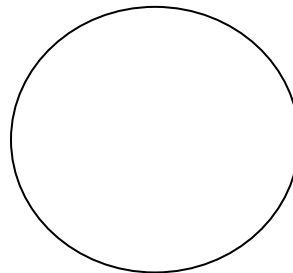


Fungal Cells

1. Put one drop of yeast suspension in the center of a clean slide. Add a coverslip. Stain the yeast cells with methylene blue stain, using the same method you used in step 3 of *Animal Cells*.
2. Observe the yeast cells using the low power objective of your microscope. Estimate the length of a yeast cell in micrometers, and in Table 1 record this data.
3. Describe the general shape of the cells also in Table 1.
4. Look for all visible cell structures and in Table 2 check off the ones you observe. Do the same thing under high power. Make sure to check off what you see in the data table.
5. Draw several yeast cells (under high power) in the circle below. Label all the structures you see.
8. Clean off your slide and obtain a slide of prepared fungal cells. Observe under high and low power. Add this cell to Table 2 and check off all visible cell structures.
9. Draw the prepared fungal cells in the circle below. Label all the structures you see. Be sure to also record the cell type on the line below the circle (ex. Mushroom etc.)

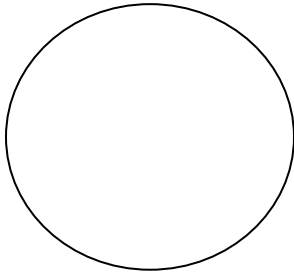


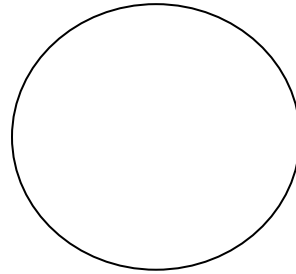
Yeast Cells



Protist Cells

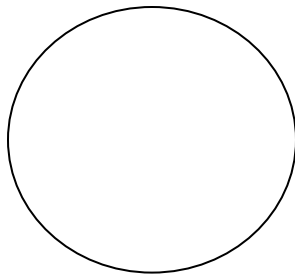
1. Obtain 2 prepared slides of different protists (ex. *Paramecium*). Observe the cells under low and high power.
2. How many nuclei can you find? _____
3. Adjust the diaphragm to let in a small amount of light. Try to see the cilia.
4. In the circles below draw the 2 different protists that you observed under high power. Label all cell structures you can identify.
5. In Table 1 estimate the size of the 2 prepared protist cells. Also give a general description of the shape of the cells.
6. In Table 2 check off all observable cell structures for each of the 2 slides you observed.

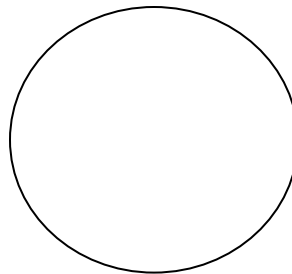




Moneran Cells

1. Obtain 2 prepared slides of different Monera (ex. *Streptococcus* etc). Observe the cells under low and high power.
2. Look for a slimy substance that covers the outside of the cells. This substance may help the cells stick together to form the long strands of organisms that you can observe.
2. In the circles below draw the 2 different monerans that you observed under high power. Label all cell structures you can identify. What structures observable in other cells, are absent in moneran cells? _____
5. In Table 1 estimate the size of an individual cell from the 2 prepared moneran slides. Also give a general description of the shape of the cells.
6. In Table 2 check off all observable cell structures for each of the 2 slides you observed.





Data Analysis:

1. Using your laboratory data, list the cell structures that are common to all cells from the 5 kingdoms.
2. Can individual cell size alone be used to determine the kingdom to which a cell belongs? Explain.
3. Use your data from Tables 1 and 2 and your textbook to summarize the features that differentiate the cells of one kingdom from the cells of other kingdoms. List these structures on Table 3 below.

Table 3: Cell Features of each Kingdom

Cell Type	Feature that differentiates Cell
Animal	Lack of cell wall
Plant	
Fungal	
Protist	
Moneran	

4. Explain how certain cell structures are specialized for certain functions by filling Table 4 below. Use your lab and your textbook to help you.

Table 4: Function of certain cell structures

Cell Type	Cell Structure	Function for Cell
Moneran	Slimy outer coating	
Protist		Allow organism to move, propel food into <i>Paramecium's</i> mouth
Fungal	Broken cell wall	
Plant	chloroplast	
Animal		Contains genetic information

5. Which of the cells you observed were autotrophic? How did you know? Which cells were heterotrophs and how did you know?

6. Which of the cells you observed would undergo respiration to release energy for use by the cell?

7. How does the cell wall of a plant cell help it maintain equilibrium?

Conclusions: Please explain three things that you learned in complete sentences.