**Observing Mitosis Lab**

**Background:**

In a growing plant root, the cells at the tip of the root are constantly dividing to allow the root to grow. Because each cell divides independently of the others, a root tip contains cells at different stages of the cell cycle. This makes a root tip an excellent tissue to study the stages of cell division.

**Materials:**

Microscope

Prepared slides of onion (allium) root tips

**Procedure:**

1. Have one person get the microscope from the cart. Be sure to carry the microscope with both hands. Plug in the microscope and make sure that the low power objective is in position and that the diaphragm is open to the widest setting.

2. Obtain a prepared slide of an onion root tip (there will be three root tips on a slide). Hold the slide up to the light to see the pointed ends of the root sections. This is the root tip where the cells were actively dividing. (The root tips were freshly sliced into thin sections, then preserved when the slide was prepared.)

3. Place the slide on the microscope stage with the root tips pointing away from you. Using the low-power objective to find a root tip, and focus it with the coarse adjust until it is clearly visible. Just above the root “cap” is a region that contains many new small cells. The larger cells of this region were in the process of dividing when the slide was made. These are the cells that you will be observing. Center the image, then switch to high power.

4. Observe the box-like cells that are arranged in rows. The chromosomes of the cells have been stained to make them easily visible. Select one cell whose chromosomes are clearly visible. (If you need to change the focus when using high power, remember to only use the fine adjust!)

5. Sketch the cell that you selected in the box for number 1 on your lab paper.

6. Look around at the cells again. Select four other cells whose internal appearances are different from each other and the first one that you sketched. Sketch them in the four boxes under #2 on your lab handout.

7. As you look at the cells of the root tip, you may notice that some cells seem to be empty inside (there is no dark nucleus or visible chromosomes). This is because these cells are three dimensional, but we are looking at just thin slices of them. (If you slice a hardboiled egg at random, would you definitely see the yolk in your slice? No.) We want to continue to look at the cells, but we will ignore any where we cannot see the genetic material (dark areas).

8. Looking along the rows of cells, identify what stage each cell is in. Use the photos on the back of this page as a guide.



9. Use the data table on your handout (question #3) to record the number of cells that you see in each of the stages. The easiest way to do this is for one person to look through the microscope, going along each row of cells. For each cell, say out loud what stage the cell appears to be in. Another student can make tally marks for each stage.

10. Answer the Analysis and Conclusion questions (4-10) on your lab handout.