Microscopic Observation Of Onion Root Tip

These are instructions to accompany the “real microscope” part of the Mitosis Lab. Do not proceed unless you have completed the “plastic microscope” part.) Now it is time for you to follow in the footsteps of Walter Flemming and discover for yourself the “dance of the chromosomes”. At each lab table there is a small foam container with a number of onion root tip slides...

1) CAREFULLY remove one of the slides and place it on the microscope stage.

2) On SCANNING power (40x) (shortest lens, black with red stripe), use the stage controls to find all slices of onion root tip on the slide, usually 3. They are arranged side-by-side on the slide, so once you find one, as in the figure to the left, use the stage controls to scan horizontally and find the others. Chose one of these slices to begin searching for mitotic cells.

3) The very tip of the root is covered with a protective cap of cells. Behind the cap is the “zone” where cells are undergoing cell division by mitosis. Use the stage controls to position the specimen so the tip of the pointer is in this zone, labeled in the figure above.

4) Use the course focus knob (big, outer one) to make sure the specimen is in focus, then increase magnification to LOW power (100x) (yellow stripe). Use the fine focus knob (small, inner one) to bring the specimen back into focus. **CAUTION! FINE FOCUS ONLY** otherwise you may break the slide! Look closely… you should see cells that look different because they are in various phases of the cell cycle. Use the stage controls to place the tip of the pointer on or near a cell of interest.

5) CAREFULLY increase magnification to HIGH power (400x) (blue stripe) (see left). Use **FINE FOCUS ONLY** and the stage controls to **identify the best representatives of each phase to draw in your lab handout**. The chromosomes are not going to be arranged perfectly as they are in diagrams. You must look carefully and interpret what you see. For each cell you draw, start by outlining the rectangular cell wall, then DRAW WHAT YOU SEE inside. LABEL EVERYTHING from the list on the lab handout!

Notes

**THERE IS NO NUCLEAR ENVELOPE** in late prophase, metaphase and anaphase! Be careful not to misinterpret the circular area within these cells. It is an artifact of the spindle and staining. Do not draw something that looks like a nuclear envelope, or worse, label something “nuclear envelope”.

**DRAW WHAT YOU REALLY SEE!** These are not the same kind of “cartoonish” drawings you are making for the Visualizing Mitosis assignment. I know what these cells look like and I can tell when you are drawing from your “imagination” or a diagram instead of what you SEE. **LABEL EVERYTHING** whether you see it or not! If you don’t see a structure but you know where it is supposed to be (e.g. centrosome), draw a pointer line and label it anyway.

**WORK TOGETHER BUT DON’T COPY!** Some slides and slices are better than others for finding particular phases. You will have to observe multiple slices and slides. If you have found a really good representative cell, announce it to the class! Show others and let them draw it!