

Lab: Onion and Cheek Cells

Mrs. Côté

Biology 11

Background:

Onion tissue as well as cheek epithelial tissue provide excellent cells to study under the microscope. The main cell structures are easy to see when a stain is used and the slide is viewed with the microscope. We will be using two stains to help give contrast to the images being viewed under the microscope. By using iodine with the plant cell it will stain carbohydrates in plant specimens brown or blue-black. Using methylene blue is helpful in identifying cell nuclei and DNA in animals. Please note that both types of stains will not only stain the specimen but can also stain skin or clothes.

Question:

What do plant and animal cells look like and what structures are able to be observed under a microscope?

Materials:

The following materials are required: clear ruler, onion, microscope, glass slides, cover slips, scalpel, forceps, scissors, paper towel, iodine and methylene blue (**Note:** iodine and methylene blue is toxic and will stain - handle with care).

Procedure: Onion Cells

1. Collect a microscope, and a clear ruler. Measure the field of view under low magnification, record this information.
2. Collect a glass slide, cover slip and section of onion.
3. Using forceps, scissors and a scalpel, remove a single layer of epidermal cells from the inner (concave) side of the scale leaf (the thinner the better). **Note: Be careful as the instruments are sharp and ensure to cut away from yourself.**
4. Put a drop(s) of water on the slide and place the single layer of onion cell epidemis on it making sure that you do not fold it over or wrinkle it.
5. Put the cover slip on the onion tissue and gently tap out any air bubbles.
6. Place a few drops of iodine along the edge of one side of the cover slip and let it soak in. Use a piece of paper towel on the opposite side of the cover slip to draw the stain through. ***NOTE: Iodine can stain/burn, handle with care.**
7. Observe the cells under 4x, 10x, and 40x. You may need to adjust the amount of light for better viewing. Once you have located the cells under high magnification show Mrs. Côté.
8. Draw a sketch of what you see under high magnification labeling **all** structures you can identify (cell membrane, cell wall, nucleus, nuclear membrane, etc...)
9. Under high magnification only, count the number of onion cells that go length wise across the field of view. Repeat this but count how many cells go width wise across the field of view. Record your results in a data table.
10. Remove the slide from the stage. Wash the onion tissue and iodine down the drain and place the slide to dry in the identified location and the cover slip in the garbage.

Procedure: Cheek Cells

1. Collect a new glass slide, cover slip and toothpick making sure to have enough materials for each member in the group.
2. Each member will add one or two drops of water to their slide.
3. Each member will gently scrape the inside of their cheek with the end of a toothpick. **Note: make sure to not gouge the inside of your cheek but just make a gentle brushing along it. Your cheek loses lots of cells in a day, it won't miss any.**

4. Each member will stir the scrapings onto the drop(s) of water on the slide and lower a coverslip onto the specimen. Make sure to gently press the coverslip down to ensure the cells make it into a single layer. **NOTE: dispose of the toothpick immediately!**
5. Add one or two drops of methylene blue stain to the edge of the coverslip and let it soak in. Use a piece of paper towel on the opposite side of the cover slip to draw the stain through. ***NOTE: Methylene blue can stain/burn, handle with care.**
6. Complete steps 7 to 9 above from the onion cell procedure for your slide. **Note: Make sure you are only observing and touching the slide you made and not your partner or anyone else's slide.**
7. Remove the slide from the stage and throw it immediately in the garbage.

Clean Up:

1. Please follow the clean-up instructions for the slides at the end of each cells procedure section.
2. Return the microscopes to the trolley properly.
3. Spray down your table, wait 10 seconds and wipe with a piece of paper towel.
4. Re-wipe the table with a damp piece of paper towel.
5. **NOTE: students are not to leave the room until all clean-up is complete!**

Analysis Questions

1. Describe shape of the two types of cells you observed.
2. Why was iodine and methylene blue added to the slides?
3. Why were no chloroplast seen in the onion cells? (No, it is not because the microscopes were not powerful enough, think about where the onions are located).
4. Calculate the length and width of 1 onion cell. Be sure to show all of your work. Note: this will be added to the data table you created during the procedure.
5. Calculate the length and width of 1 cheek cell. Be sure to show all of your work. Note: this will be added to the data table you created during the procedure.
6. Are there any structures that were found in one cell but not the other? Identify what these were and which cell they were located in.