Lab Script: Plant & Animal Cells

Biology 11

Background:

Onion tissue as well as cheek epithelial tissue provide excellent cells to study under the microscope. The main cell structures such as the nucleus, nuclear envelope, cell membrane and wall as well as the cytoplasm 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.

Lab Safety & Procedures First!

- What are some safety precautions we should have in using the scalpels?
- Why must we be careful when using personal samples?
- What care should we take in using personal samples?

Pre-Lab Questions:

1. What is iodine and methylene blue? What are each used for?
2. What are the differences between a plant and an animal cell?
3. What are chloroplast and what is their function?
4. Where and how does an onion grow?

Lab 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: thin cross section of an onion, microscope, glass slides, cover slips, scalpel, forceps, scissors, paper towel, iodine and methylene blue, goggles (**Note:** iodine and methylene blue are toxic and will stain - handle with care for the extension, a clear ruler.

Procedure: Onion Cells

1. Collect a glass slide and put 2 to 3 drops of water on it.
2. Using forceps, scissors and a scalpel, remove a single layer of epidermal cells from the inner (concave) side of the onion layer (the thinner the better). **Note: Be careful as the instruments are sharp and ensure to cut away from yourself.**
3. Place the single layer of onion cell epidermis on the slide with the drops of water making sure that you do not fold it over or wrinkle it.
4. Place a couple of drops of iodine on top of your onion specimen and let it soak in. ***NOTE: Iodine can stain/burn, handle with care.**
5. Put the cover slip on the slide at a 45-degree angle and place it over your onion sample. Gently tap out any air bubbles with your pencil.
6. Collect a microscope, and properly set it up (see front of lab script for further instructions).

7. Observe the cells under 4x, 10x, and 40x. You may need to adjust the amount of light using the diaphragm for better viewing (see the front of the lab script for further instructions). Once you have located the cells under high magnification show Mrs. Côté.
8. Draw a sketch or take a picture with your cell phone of what you see under high magnification, remember to include all the information you will need to be able to complete a good copy at a later time.
9. **Extension Only:** Calculate the Field of View for the microscope you are using, remember you will need a clear ruler. Under low magnification only, count the number of onion cells that go length wise across the field of view's diameter. Repeat this but count how many cells go width wise across the field of view. Record your results in a data table. If the cells do not cover the entire field of view, estimate how many cells it would take to do so.
10. **CLEAN UP:** Remove the slide from the stage and throw out the cover slip. Wash the onion tissue and iodine down the drain and place the slide to dry at the identified location.

Procedure: Cheek Cells

1. Collect a new glass slide, cover slip and toothpick.
2. Add two or three drops of water to the slide.
3. 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. Smear and stir around the scrapings onto the drops of water on the slide. **NOTE: dispose of the toothpick immediately!**
5. Add ½ of a drop of methylene blue stain to the specimen and let it soak in, you do not need very much of this to stain the slide, too much will result in floating cells ***NOTE: Methylene blue can stain/burn, handle with care.**
6. Lower a coverslip onto the specimen at a 45-degree angle. Make sure to gently press the coverslip down to ensure the cells make it into a single layer, tap out any water bubbles with a pencil.
7. Use a piece of paper towel on the opposite slide of the cover slip to clean up any access water or stain.
8. Collect a microscope, and properly set it up (see front of lab script for further instructions).
9. Observe the cells under 4x, 10x, and 40x. You may need to adjust the amount of light using the diaphragm for better viewing (see the front of the lab script for further instructions). Once you have located the cells under high magnification show Mrs. Côté. **Note: Make sure you are only observing and touching the slide you made and not anyone else's slide.**
10. Draw a sketch or take a picture with your cell phone of what you see under high magnification, remember to include all the information you will need to be able to complete a good copy at a later time.
11. **Extension Only:** Complete step #9 from the above and add your information to your data table.
12. **CLEAN UP**: Remove the slide from the stage and throw all materials immediately in the garbage including the slide. Gently clean off the stage of the microscope using the alcohol swabs provided. Wipe down your work station with cleaning spray.

Essential Outcome Summative Assessment:

Complete **2 PROPER biological diagrams**, one for the onion cell on high power and one for the cheek cell on high power. Make sure to label all organelles you can **see** understanding that most will not be visible. This is to be passed in and used as an assessment.