Oregon Health and Science University Coding Bootcamp 2022

Day 1 Lab

Staining the Slide - Methylene Blue and Eosin Stain

Materials:

- Water cup with a spoon
- Methylene Blue and Eosin dye
- Cotton swab
- Glass slide with cover
- Clorox bleach wipe
- PPE (gloves, lab coat, etc)

Protocol:

1. Put on your PPE and prepare your workstation
2. Begin by swabbing the inside of your cheek and dropping 3 drops of methylene blue dye onto the swab
3. Give the swab about 30 seconds to absorb cells and dye, then rinse thoroughly with water
4. Then drop 3 drops of eosin onto the swab, and rinse
5. Using a bleach wipe, sanitize the glass slide and microscope
6. Set up and focus microscope in kit
7. Then swab sample onto the slide, this may take some force, try streaking swab then dabbing aggressively
8. Refocus the slide on the microscope and examine for cells
9. Record what you see
    a. Think what materials of your sample may be made visible by the dye
10. To preserve your slide place a glass slide cover on top of streak
11. Leave out to dry for next day

Day 2 Lab

Staining the Slide Follow-up

Materials:

- Water cup with a spoon
- Methylene Blue and Eosin dye
- Cotton swab
- Glass slide with cover
- Clorox bleach wipe
- PPE (gloves, lab coat, etc)

Protocol:

12. Put on your PPE and prepare your workstation
13. Retrieve slide from previous day and focus camera on blank slide
14. Refocus the slide on the microscope and examine for cells
15. Discuss changes and findings

Imaging Plants

Additional Materials:

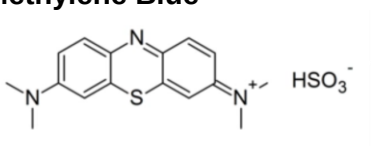
- Iodine dye

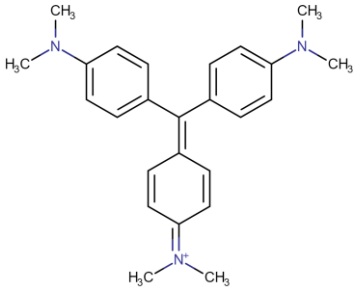
Protocol:

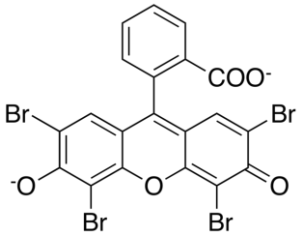
1. Put on your PPE and prepare your workstation
2. Using a bleach wipe, sanitize the glass slide and microscope
3. Set up and focus microscope in kit
4. Begin by processing your sample:
    a. Peeling - start here
        i. Peel or crush leaves, stems, or onion skins to image
    b. Slicing
    c. Scraping
        i. Cut a potato or sweet potato in half, scrape a little of the potato (like a puree) onto the microscopic slide, and add a drop of water
    d. Smashing
        i. Smash the root tip of an onion into a thin layer of tissue between a microscopic slide and a spoon (be careful not to break the glass slide)
        ii. The onion root tip smear is great for staining with iodine (for starch storage visualization) and with Methylene Blue (to see cells undergo mitosis)
            1. The same method can also be used in fruits (like bananas) and seeds (like corn kernels). Soaking seeds in water for a day may be required for some hard seeds
5. Refocus the slide on the microscope and examine for cells

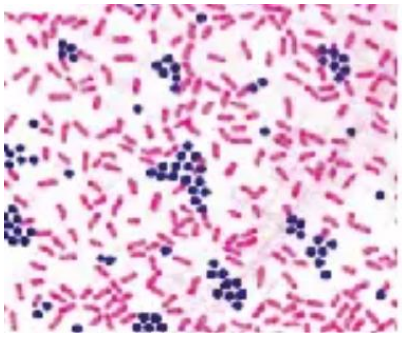
Dye Information

Dye	General Information

Methylene Blue
 
	• Stains bacteria and eukaryotic cells
	  ○ Dyes to protein receptors and strongly to DNA
	• Other purposes of Methylene Blue
	  ○ Chemical indicator
	  ■ Redox reactions
	  ■ Makes water acidic
	  ○ Medication
	  ■ Methylene blue and oxygen therapy are used to treat Methemoglobinemia

Gentian Violet
 
	• Gentian violet can dissociate and penetrate through the wall and membrane of both gram-positive and gram-negative bacterial cells
	• Interacts with lipopolysaccharides (on the cell wall), the peptidoglycan and DNA
	• Relatively mild coloring effects on mammalian cells
	• Other purposes of Gentian Violet
	  ○ Medicine
	  ■ Can be used for fungal and bacterial infections

Eosin
 
	• Used to stain cytoplasm, red blood cells, collagen, and muscle fibers for histological examination
	• It is a synthetic acidic dye that binds to basic components of a cell, mainly proteins located in the cytoplasm
	  ○ Combined with haematoxylin, used for histology
	• Other purposes of Eosin:
	  ○ Painting
	  ■ Some of Van Gogh's early impressionism

Iodine
 
	• Used for gram staining bacteria and plants
	  ○ Iodine can be used as a starch indicator. Starch is a type of sugar (or carbohydrate) with long and branching chains
	• Other purposes
	  ○ Medicine
	  ■ X-ray-based imaging modalities such as computed tomography (CT)
	  ■ Iodine solution is common for antiseptic