

Examination of animal and plant cells using a light microscope and production of labelled scientific diagrams from observation

Introduction

Cheek cells are typical animal cells, they have a cell membrane, cytoplasm and a nucleus. Onion cells are plant cells, they have a cell wall, cell membrane, cytoplasm, nucleus and vacuole. This practical requires you to prepare cheek cell slides and onion cell slides. These slides can then be observed using a microscope.

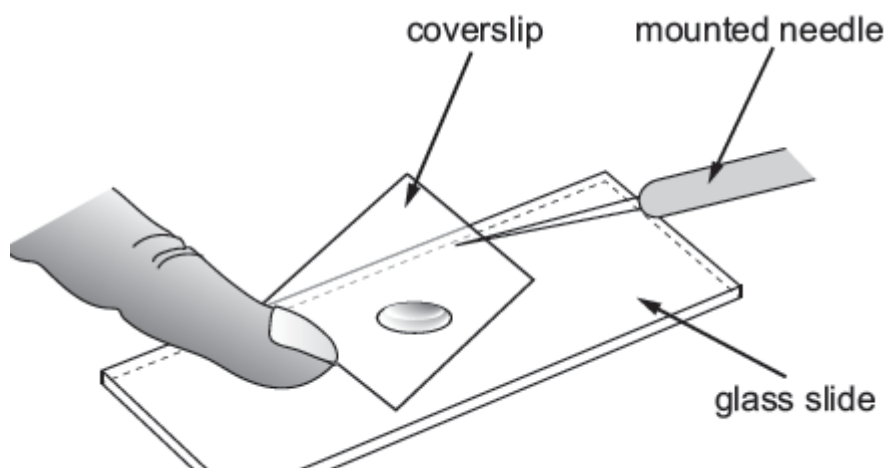
Apparatus

light microscope
 2 × glass slides
 2 × cover slips
 cotton wool bud
 mounted needle
 forceps
 freshly cut onion
 0.1 % methylene blue solution
 iodine solution

Access to:

beaker of disinfectant

Diagram of Apparatus



Method

Cheek Cells:

1. Put a drop of methylene blue on a glass slide.
2. Gently rub the inside of your cheek with a cotton bud.
3. Wipe the end of the cotton bud in the drop of methylene blue on the glass slide.
4. Place the cotton bud in the beaker of disinfectant.
5. Use the mounted needle to gently lower a coverslip onto the glass slide.
6. Using a light microscope, examine the slide using the $\times 10$ objective lens.
7. Use the $\times 40$ objective lens to identify some of the cell structures.
8. Draw a cell diagram. Identify and label: cell membrane, cytoplasm and nucleus.

Onion Cells:

1. Using forceps, peel a thin layer of epidermis from the inside of a freshly cut onion piece.
2. Lay the epidermis onto a glass slide.
3. Add a drop of iodine solution to the onion epidermis on the glass slide.
4. Use the mounted needle to gently lower a coverslip onto the glass slide.
5. Using a light microscope, examine the slide using the $\times 10$ objective lens.
6. Use the $\times 40$ objective lens to identify some of the cell structures.
7. Draw a cell diagram. Identify and label: cell wall, cell membrane, cytoplasm and nucleus.

Analysis

1. Calculate the total magnification of the image seen by multiplying the power of the objective lens by the power of the eyepiece.
2. Your teacher will tell you the actual size of the cell, calculate the magnification of your diagram.

Risk Assessment

Hazard	Risk	Control measure
Methylene blue is harmful and/or irritant	Methylene blue can irritate the eyes and lungs. Skin contamination should be avoided.	Use the lowest concentration possible. Wear eye protection when preparing the cheek cell slide. Methylene blue is a stain- avoid contact with skin.
Cheek cells are a biohazard	There is a very small risk of virus transmission.	Only handle samples from your own body. After use, hygienically dispose of cotton buds and slides in a disinfectant such as Milton or Virkon.
Coverslips/ mounted needles are sharp	Can cut skin	Handle carefully

Teacher/Technician notes

Methylene blue and iodine solution are stains. Avoid contact with the skin. Iodine is a low hazard chemical as a dilute solution.

Suitable disinfectant would include Milton or Virkon which would need to be diluted to suitable concentrations.

If the lamp is not an integral part of the microscope, a desk lamp will be needed for each group.

Freshly cut onion is recommended. This should be prepared for student use in pieces approximately 1 cm².

Students will need to be briefed regarding safe and effective microscope use prior to this practical activity. This practical activity is effective at developing microscope skills and biological drawing skills.

Students can calculate the total magnification of the image as the power of the objective lens multiplied by the power of the eyepiece. The actual size of the cells can be given to the students to enable them to calculate the magnification of their diagrams.

Practical techniques covered

- B3 Use of appropriate apparatus and techniques for the observation and measurement of biological changes and or processes.
- B4 Safe and ethical use of living organisms (plants or animals) to measure physiological functions and responses to the environment.
- B7 Use of appropriate apparatus, techniques and magnification, including microscopes, to make observations of biological specimens and produce labelled scientific drawings.