

Activity 3.2: Light Microscopic Observation of Cells

In this activity, you will prepare a sample of the cells that line the inside of your cheeks (i.e. a buccal smear) and then examine it under a light microscope.

METHOD FOR THE PREPARATION AND STAINING OF A BUCCAL SMEAR

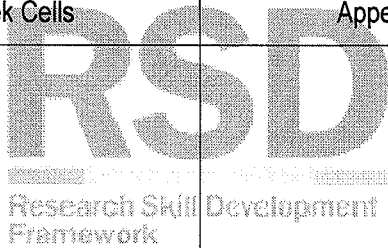
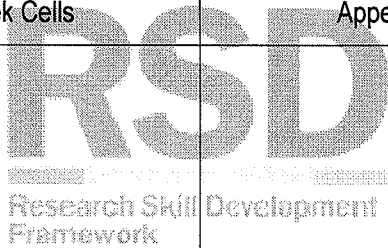
Prepare specimens as follows:

1. Using a pipette, place a small drop of distilled (purified, clean) water in the centre of a clean microscope slide.
2. GENTLY and lightly scrape the inner lining of your cheek with the broad end of a flat toothpick.
3. Stir the toothpick vigorously in the drop of water on your slide, and then dispose of the toothpick in the container for hazardous waste.
4. Cover the drop with a clean cover slip lowered onto the slide at an angle to minimise the formation of air bubbles between the specimen and the cover slip. If there is too much liquid on the slide, blot the excess from the edges of the cover slip using absorbent paper towel.
5. Repeat steps 1 to 4 for a second specimen, but this time add a drop of 10% methylene blue stain to the water-cheek cell suspension on the slide, prior to adding the cover slip.

METHOD FOR LIGHT MICROSCOPIC EXAMINATION OF A CELL SMEAR

6. Examine your prepared specimens by following the protocol for the appropriate use of a light microscope as presented on pages 1-2 of the Laboratory Notes. Examine the appearance of the cells on the slide using first the low power, 4x objective lens, before moving to the higher power 10x and 40x objective lenses.
7. In Table 3.1, draw the typical appearance of a cheek cell, as observed at high magnification for both the unstained and the stained smear.

Table 3.1

Appearance of Unstained Cheek Cells	Appearance of Stained Cheek Cells
	

8. On each of your drawings, accurately label the cell's nucleus, cytoplasm and plasma membrane. Can you identify any additional components or features of the cells in your smear preparations? If so, label these on your drawings.
9. What effect, if any, did the methylene blue have on the cells in your preparation? List the advantages of staining cells (and tissues) before viewing them under the light microscope.
10. Most tissue preparations are stained with not one, but two different dyes. The most widely used combination of dyes used for staining in light microscopy is haematoxylin and eosin (H&E). What colour is haematoxylin?


What colour is eosin?


Laboratory 3, Activity 3.2: LM Observation of Cells: Marking Criteria

Student Name: _____

Student ID: _____

Marker: _____

 Facet of Inquiry	Student Autonomy Level 1 <i>Students research at the level of a closed enquiry and require a high degree of structure/ guidance</i>	Student Autonomy Level 2 <i>Students research at the level of a closed enquiry and require a some structure and guidance</i>	Level 3 <i>Students research independently at the level of a closed enquiry</i>
A. Students embark on inquiry and so determine a need for knowledge/ understanding	<input type="checkbox"/> Identifies an appropriate purpose/reason for undertaking Activity 3.2 (LM Observation of Cells)	<input type="checkbox"/> Clearly & concisely identifies several principle purposes/ reasons for undertaking Activity 3.2 (LM Observation of Cells)	
B. Students find/generate needed information/data using appropriate methodology	Generally follows methods/ protocols, yet some aspects omitted or incomplete, for: <ul style="list-style-type: none"> <input type="checkbox"/> preparation of a cell smear <input type="checkbox"/> staining <input type="checkbox"/> operation of microscope <input type="checkbox"/> Q9 or Q10 correct 	Rigorously adheres to methods/ protocols for: <ul style="list-style-type: none"> <input type="checkbox"/> preparation of a cell smear <input type="checkbox"/> staining <input type="checkbox"/> operation of microscope <input type="checkbox"/> Q9 & Q10 correct 	
C. Students critically evaluate information/data and the process to find/generate this information/data	<input type="checkbox"/> Presents data generated after consideration & evaluation of only part of the overall activity <input type="checkbox"/> Accurate contrast, missing some details, in Q11	<input type="checkbox"/> Presents data based on consideration & evaluation of most or all parts of the activity <input type="checkbox"/> Accurate, detailed contrast in Q11	
D. Students organise information collected/ generated	<input type="checkbox"/> Produces drawings that are partially labelled & depict some structural features of the cells <input type="checkbox"/> Ideas/ data not always presented in a logical sequence within answers	<input type="checkbox"/> Produces drawings that are appropriately labelled & accurately depict most or all observable structural features of the cells <input type="checkbox"/> Ideas/data presented in logical sequence within answers	
E. Students synthesise and analyse and apply new knowledge	<input type="checkbox"/> Understanding of cell structure & function is based on cell smear activity only <input type="checkbox"/> Some valid inference in Q12 or Q13 <input type="checkbox"/> Linkage between cellular features & functions partially explained or incorrect for Q 13	<input type="checkbox"/> Understanding of cell structure & function utilises data obtained from the cell smear activity as well as other sources (e.g. interpretations of tissue section) <input type="checkbox"/> Explanation based on evidence and valid inference in Qs 12 & 13 <input type="checkbox"/> Linkage between cellular features and functions fully explained & accurate for Q 13	
F. Students communicate knowledge and the process used to generate it, with an awareness of ethical, social and cultural issues	<input type="checkbox"/> Aspects of the student's conduct within the laboratory indicate some awareness of safe practice protocols	<input type="checkbox"/> Student's conduct within the laboratory indicates a thorough awareness and understanding of safe practice protocols	