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?

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11. Now briefly examine slide 56 – Lip (H&E) from your slide box. Locate the region of tissue shown on the laboratory monitors. This region is the inner surface of the lip and is composed of the same cell type as that in your smear. How do these cells appear different from those in your smears?

12. Explain the reason(s) for the differences in cellular appearance between the two preparations.

13. On the basis of their appearance and arrangement, suggest a possible function(s) of buccal cells. Where possible, link individual features with their contributions to the overall function of these cells.

14. Review what you have achieved by completing Activity 3.2 and list up to 3 learning objectives addressed by the activity.

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