

Leaf Epidermis

The epidermis of a leaf can be separated from the rest of the leaf tissue and easily observed under a microscope.

Materials

leaf from a well-watered that has been in bright sun or under fluorescent lights

microscope slide

forceps

cover slip

eye droppers

iodine solution

compound microscope

Procedure

1. Remove a piece of the lower epidermis of a leaf. Hold one leaf in your hands with its lower surface facing up. Break the leaf with a snapping action. This will leave the two parts connected at the bottom by a transparent layer, which is the lower epidermis. Using forceps carefully peel away one half of the leaf from the epidermis attached to the other half of the leaf. Cut a 1 cm x 1 cm piece of the epidermis and prepare a wet mount.
2. Use high power to examine a single stoma, its guard cells, and surrounding epidermal cells. Record the arrangement, shape and cell contents for each.
3. Count and record the number of stomata you can see in the low power field at one time. Move the slide to a different position and count the number of stomata again. Record the number of stomata for five different fields.
4. Switch to high power and carefully observe a single stoma on high power. Find out if it is open or closed. Describe the shape, colour, and contents of the guard cells. Make a large labelled drawing of one stoma with its guard cells and a few surrounding epidermal cells.
5. Place a couple of drops of iodine solution at the edge of the coverslip of your slide. Use a small piece of paper towel to draw the iodine solution across the slide. Once the iodine solution has been added, examine the stomata and record any changes in the guard cells.
6. Remove the slide from the microscope and discard the specimen. Make a second slide using the upper epidermis of the same leaf. Count and record the number of stomata you can see in the low power field at one time. Move the slide to a different position and count the number of stomata again. Record the number of stomata for five different fields.

Questions

1. a) What shape were the epidermal cells of the plant you observed?
b) What cell contents were visible in the epidermal cells?
c) What is the function of epidermal cells?
2. a) What shape were the guard cells?
b) What cell contents were visible?
3. a) Which leaf surface had the most stomata?
b) What advantage might this give to the plant?
4. What differences did you observe after adding iodine to the slide?
5. Why is it important that the plant be well watered and receive bright light before this experiment?