

General Cell Structure

3 in Animals

MATERIALS

Alcohol	Needle
Cover slips	Paper toweling
Distilled water	Round toothpicks
Iodine	Toothpick (round end)
Janus Green B stain	Typical animal cell slide
Microscope	Wright's stain
Microscope slides: depression and flat	

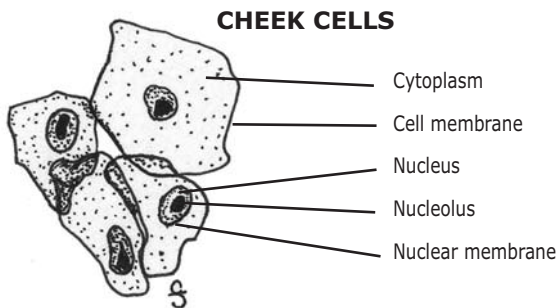
The characteristics of the cells of animals are, of course, dependent on the function of that cell within the organism. Because of this, animal cells are not all alike, but are specialized.

However, there are certain features of animal cells which are characteristic. Some of these characteristic features are also present in plant cells, like cell membranes and nuclei. Others may be present in animal cells only, for instance, flagellae.

WARNING!!

Do not use these human tissue slide preparations if your school is not a family home school. You will understand that in the current crisis with the HIV and associated viruses, preventing transmission must be the teacher's foremost concern in the biology classroom.

During this laboratory, you will identify some of the structures which occur within the animal cell.



Procedure:

- Using a round-ended toothpick, gently scrape the inside of your cheek. The toothpick will pick up cheek cells.
- Wipe the cells onto a glass microscope slide and cover with a cover slip. With a fingertip or a pencil eraser, carefully push down on the cover slip without breaking it. If your cover slip is glass, you are very likely to break it if you push more than just barely. This is a dry mount.
- Place the slide on the stage of the microscope and focus using low power. After the scope is focused, you may switch to high power while

looking directly at, not through, the objective lens. You should not have to refocus, but if you do, use these directions: **While looking directly at the bottom of the objective lens and the slide, carefully lower the lens until it is not quite touching the slide. Now, looking through the microscope, pull the objective back away from the slide using the fine adjustment knob. This will allow you to focus the slide without putting the objective lens right through it.**

4. Make a drawing of your observations. You will be able to see the cell membrane, the almost translucent cytoplasm, and perhaps, the nucleus. Place a drop of water on the edge of the cover slip so that the water is drawn under the slip. This is a wet mount. Do you see any of the organelles more clearly? If so, draw them again, labelling the drawing as to the type of mount you have used.

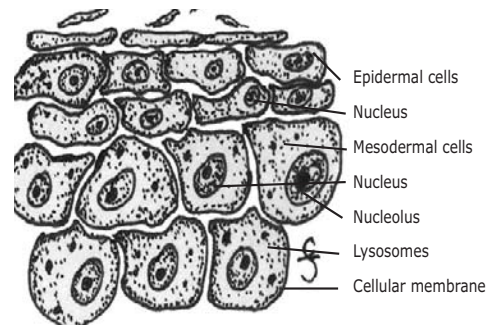
5. Place a drop of iodine on the edge of the cover slip. Use a piece of a paper towel to draw the stain through the material under the cover slip. To do this put an edge of the paper towel next to the cover slip. Because of the absorbency of the towel, the stain will be drawn through towards the towel and in the process stain the cells in its path.

6. This stain will color the nucleus and the nucleolus. The nucleus will be the round or oval shaped structure within the cell that is darkly stained. The nucleolus will be an even more darkly stained area within the nucleus.

7. Draw a small group of cells which will show the general shape and arrangement of the cheek cells. Draw a representative cell above or beneath the group and label its organelles which you have been able to identify. Also present but more difficult to see are: **mitochondria, golgi bodies, endoplasmic reticula, ribosomes, and lysosomes.**

SQUAMOUS EPITHELIAL CELLS

(typical animal cells from slide)



8. Typical animal cell.: Change slides to the typical animal cell slide and view under low power, then high power.

9. Make a group drawing of several of the cells. Then draw one cell labelling its parts. View under higher power in order to see the parts more clearly. Be very careful to keep from cracking the slide by moving the objective lens down only while looking directly at the objective and slide.

10. This cell has been stained so that some of the parts are colored. You may reflect those colors and shading in your drawings by coloring your work. The nucleus will be evident as will the plasma membrane. You will notice that the cells are surrounded by similar cells. This is a tissue and it functions as a unit, performing metabolic activities for the body, hence the similar appearance of these cells. Notice the outer cells have a different shape: thinner and elongated. These provide a covering for the internal cells. In an organ there is a membrane which surrounds the organ like a skin and provides the same function. Draw a representative grouping of the outer cells as well as the inner.

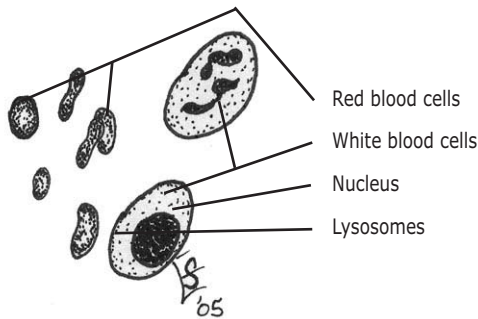
13. Without using a cover slip, observe under high power. Notice that the most numerous cells (the red ones) do not possess nuclei. Some of the white cells will appear to have several nuclei. Make drawings of both types of cells.

14. The white cells, or lymphocytes, have inclusions of different colors within the cells. They may also have visible lysosomes. The lysosomes contain very strong enzymes which break down bacteria, other body invaders, and worn out cell components.

15. On the slide with the cheek cells and on the drop of blood, add one drop each of Janus Green B stain. This should stain the mitochondria of the cells. To the blood slide add a cover slip and observe. Draw the stained cells and the mitochondria, if possible.

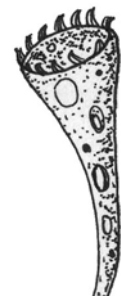
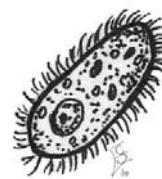
Organelles not observed in the cells of this experiment, but which may be part of certain animal cells, especially those of free swimming organisms:

BLOOD CELLS



11. Blood cells: After washing your hands and wiping the tip of a finger with an alcohol prep, prick the finger tip and squeeze a bit of blood onto a glass slide. Hold another slide at a 45° angle and push the drop of blood across the slide, making a smear. Let the slide dry.

12. Put two drops of Wright's stain on the blood smear and let it sit for a minute or two. Gently swish the slide in a container of distilled water. Do not hold under the running faucet. Let it dry again.



GENERAL CELL STRUCTURE IN ANIMALS

Critical Thinking:

1. Why do you think that biologists would need many different type of stains and staining techniques?

2. Why do you think that the structures within the cells are called 'organelles'? Explain your answer.

3. In the classification systems of the past one-celled animals have been described as 'simple organisms'. Why do you think that this may have been erroneous based upon what you have observed during this laboratory experience?

4. Why might a cell from a multicellular organism be considered more simple than that of a one-celled organism?

5. Mitochondria are called the powerhouses of the cell. They metabolize food products to release energy. In what type of cell would you expect to see an increased number of mitochondria: cheek cells, muscle cells, bone cells, epithelial cells? Explain your answer.

6. You have seen several different shapes in animal cells. What is your hypothesis on the reasons for the different shapes?

7. The red blood cells do not have nuclei. What two important functions of the nuclei do not seem to be necessary to the red blood cells? Why?
