6 NERVE CELLS (300x)

This slide was made from part of the human brain that controls memory, thinking and learning. It shows several nerve cells, each of which has a thick main cell body and many long extensions. The stain used deposits a great deal of dark color in the cell. Unfortunately, the staining hides the nucleus and other internal structures of the cell body (see arrow).

We use this dark stain to bring out the many long fibers which extend from the main cell body. Some of these fibers make hundreds of connections with other nerve cells to control our behavior.

An entire brain cell cannot be seen here because the long fibers go far beyond the focus and field of the microscope.

7 BACTERIA (1500x)

The large oval bodies you see are bacteria from the scalp. They may be the cause of dandruff. Bacteria used to be classified as one-celled plants. They now are placed in a separate group called Monera.

At the high magnification used here, we can see the inner structure of the bacterial cell.

The granules which appear as dark round spots within the cell are of various kinds. Some of them are nuclear material. Unlike most other cells, the bacterium does not have a true nucleus.

Within this field you see several other kinds of bacteria. Thousands of varieties of bacteria have been recognized. The study of bacteria is a branch of Biology known as Bacteriology.

8 VIRUS (50,000x)

This is a photo of viruses attacking a bacterium. The large dark area is the bacterium and the viruses are the small dark spots indicated by the arrows.

Viruses are too small to be seen with the ordinary microscope. This photo was made with the aid of an electron microscope which is capable of magnifying even more than the 50,000x used here.

Whether or not viruses are cells is a question. They do not have a typical cell structure and the performance of life functions in viruses is very different from that of other living things.

SET 58

CELL STRUCTURE 19

In the early part of the 19th century, scientists, after extensive studies of animals and plants under the microscope, concluded that all living things are made of cells.

These slides have been selected to enable you to study the principal parts of the cell. You will notice that the cells of different plants and animals have variations in their structure adapted to their special functions.

A knowledge of the basic characteristics of the cell is necessary for understanding all living things.

The magnification given, for example, 300x for Slide 1 - Cork - means that the microscope was set at that power when the photograph was taken.

1 CORK (300x)

This is a microslide view of a thin slice of cork. In the 17th century Robert Hooke made thin slices of cork and studied them with the crude microscope of his day. He was impressed by the box-like appearance of the material.

Hooke called these dark-walled boxes "cells." The name has become one of the best-known scientific terms, although Hooke had no idea of the importance of this discovery.

The cells of this material are empty. This is because cork is a dead and dried out part of the tree.

The dark shadows, which seem to be within the cells, are actually the walls of other cells below.

2 ONION SKIN (200x)

This slide was made by separating the thick sections of a fresh onion and peeling off a thin colorless layer between them. This layer was stained with iodine to get better contrast between parts. The skin of an onion section is excellent for study because it is only one cell thick and is easily prepared for observation.

Inside the cell wall (A), there is a thin liquid called cytoplasm (B). As usual, the cytoplasm appears quite granular.

Lying in the cytoplasm is a darker round body called the nucleus. C points to a nucleus. How many nuclei does each cell of the onion skin have? The membrane (D) in the fresh onion skin is hard to see because it lies flat against the inner surface of the wall. Most cells have these three parts: a membrane, cytoplasm and a nucleus. The plant cell, in addition, has a wall surrounding the membrane.

3 GREEN LEAF (300x)

This is a cross section of a green leaf showing different kinds of cells. It is not always possible to see all the parts in the same cell. A points to a cell in which you can see several parts. This cell is surrounded be a wall. It is filled with a jelly-like material called cytoplasm, which appears faintly green. The many dark green spots are the chloroplasts. You cannot see the membrane which surrounds the cytoplasm of this cell because it is very thin and lies flat against the wall.

A nucleus is more clearly seen in the cell at B. C points to a bundle of tubular cells which form a vein. Leaves have many veins. If you look carefully, you can locate others. D shows one of the spaces in which air circulates throughout the leaf. E points to an opening through which the leaf breathes. Can you find other such openings?

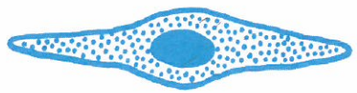
4 CHEEK CELLS (900x)

To make this slide we gently scraped the inner surface of a person's cheek with a toothpick and spread the material on a glass slide.

Here we can see the three parts that make up almost all cells. Can you identify these three parts in human cells? The dark line surrounding each cell is the membrane. Animal cells, unlike plant cells, do not have walls.

Some of the oval granules seen near the head of the arrow may not be inside of the cell. They are probably some of the bacteria of the mouth clinging to the outer surface of the cell.

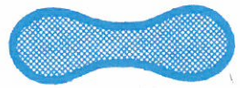
Cheek cells are thin and flat. Through the microscope we see the flat side. If we could see them on edge, they would look like this.



5 BLOOD CELLS (900x)

To make this slide, a small drop of human blood was smeared flat. The liquid part (plasma) was permitted to dry, and the cells that remained were stained.

A points to a red blood cell. All normal red blood cells have about the same shape. The red blood cell has no nucleus and does not reproduce. The light region in the center of cell A is not a nucleus, but is due to the fact that this region is thinner than the rim of the cell. If it were seen on edge, a red blood cell would look like this.



B points to one kind of white blood cell. It is recognized as a white blood cell by its size and nucleus. Note that it is about twice as wide as a red cell. What appears to be four dark purple lumps is really one nucleus. Can you see fine strands connecting the segments of the nucleus?

At C is another kind of white blood cell. Note how it differs from the cell at B. There are several other kinds of white blood cells which are not seen here.

D shows a cluster of tiny blood cells called platelets. These are the third kind of blood cell.

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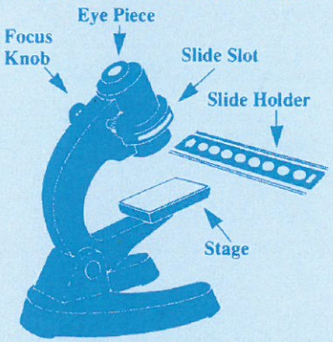
MICRO-SLIDE-VIEWER™



Face the Micro-Slide-Viewer so that as much light as possible falls on the white Stage.

Insert the numbered end of the Slide Holder into the Slide Slot of your Viewer, moving it from your right to left.

View with your eye close to the Eye Piece.

With Slide No. 1 in place, focus by turning the Focus Knob.

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