

ANIMAL TISSUES

MUSCLE, BONE, CONNECTIVE, NERVE

The human body, like the body of any animal or plant, is made up of many millions of individual cells. But these cells are not scattered through the body in disorder or confusion. The body is a well-organized community of cooperating cells.

Cells adapt themselves and develop into a remarkable variety of different forms and sizes. Similar cells group together to perform similar work. The work these cells do is called a special function of the cells, and the group of cells itself is called a *tissue*.

In their turn, tissues group together to perform a special life function. Such groups of tissues are called *organs* of the body.

In the following slides we shall examine the peculiar shapes and sizes developed by some cells in order to form tissues which carry on special life functions.

The magnification given, for example, 900x for Slide 1 - Voluntary Muscle Cells - means that the microscope was set at that power when the photograph was taken.

1. VOLUNTARY MUSCLE CELLS (900x)

This slide shows part of a voluntary muscle. Over 40% of the weight of your body is made up of *voluntary muscle tissue*. These muscles are called voluntary because they will contract and move parts of your body when you wish them to.

The muscle cell is several inches long. The area shown at this magnification is too small to show the cells from end to end.

The nucleus of one of the cells is shown at

(A). Can you find other nuclei?

The cytoplasm of the cell consists of long threads which are called *fibrils*. These are spotted in such a way as to give the cells a peculiar striped appearance. For this reason the voluntary muscle is also called a *striated muscle tissue*.

When you wish to do something, your brain sends a message to the particular voluntary muscle which carries out the function. The fibrils in the cells shorten and the entire muscle contracts, thus pulling the part of your body to which it is attached.

They are unusual in that they have no nuclei. A small drop of blood usually contains about 5 million red cells.

Of the various kinds of white cells, three can be seen on this slide. One type (A) is made in the bone marrow. Types (B) and (C) are made in the lymph glands and in the spleen. All white blood cells have nuclei. Their function is to destroy bacteria and other foreign invaders of the body. A small drop of blood usually contains about 7,500 white blood cells.

A group of platelets can be seen at (P). They are formed of fragments of the cytoplasm of certain giant cells in bone marrow. When you cut your finger, the platelets release a chemical that starts the formation of a blood clot to stop bleeding.

cell. It became so full of fat that the nucleus (A) and the cytoplasm were crushed against the cell membrane.

A small blood vessel can be seen at (B). When a person becomes overweight, his body is forced to grow many miles of extra blood vessels in the fat tissue. This puts a strain on the heart.

feet to contact other cells. Through these fibers, nerve impulses travel from one part of the body to another.

The brain, the spinal cord and the nerves of the body are made of nerve tissues.

The red streaks shown here are small blood vessels which bring food and oxygen to the tissues and carry away wastes.

6. BLOOD (480x)

Many scientists consider blood to be a connective tissue. The intercellular material is a liquid called the plasma.

To prepare blood cells for the microscope, a drop of blood was spread in a thin film on a slide. When all the plasma dried, the cells remained and were stained to make them visible.

The numerous pale round cells (R) are the red blood cells (corpuscles). They are flat disks, very thin in the center and thick around the edge. They contain a substance called hemoglobin which combines with oxygen when it enters the lungs and releases the oxygen in the tissues. The red cells are made in bone marrow.

7. ADIPOSE TISSUE (150x)

This is a slice of a layer of skin showing the fat or adipose tissue. The cells look like big round bubbles. Actually the white circle consists of food that has been absorbed and changed to fat.

Each one of these cells is a connective tissue

8. SPINAL CORD (75x)

Among the most unusual cells in the body are those which specialize in carrying messages.

The large, dark blue, irregular shapes shown here are nerve cells (neurons) in the spinal cord. Each neuron has a main thick part, the cell body, where the nucleus (N) is surrounded by the cytoplasm. From the cell body, one or more long fibers extend outward. Some of these fibers are short, others stretch out for several



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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