

# Cells and the versatile functions of their parts

By National Geographic Society, adapted by Newsela staff on 04.01.19

Word Count **925**

Level **600L**

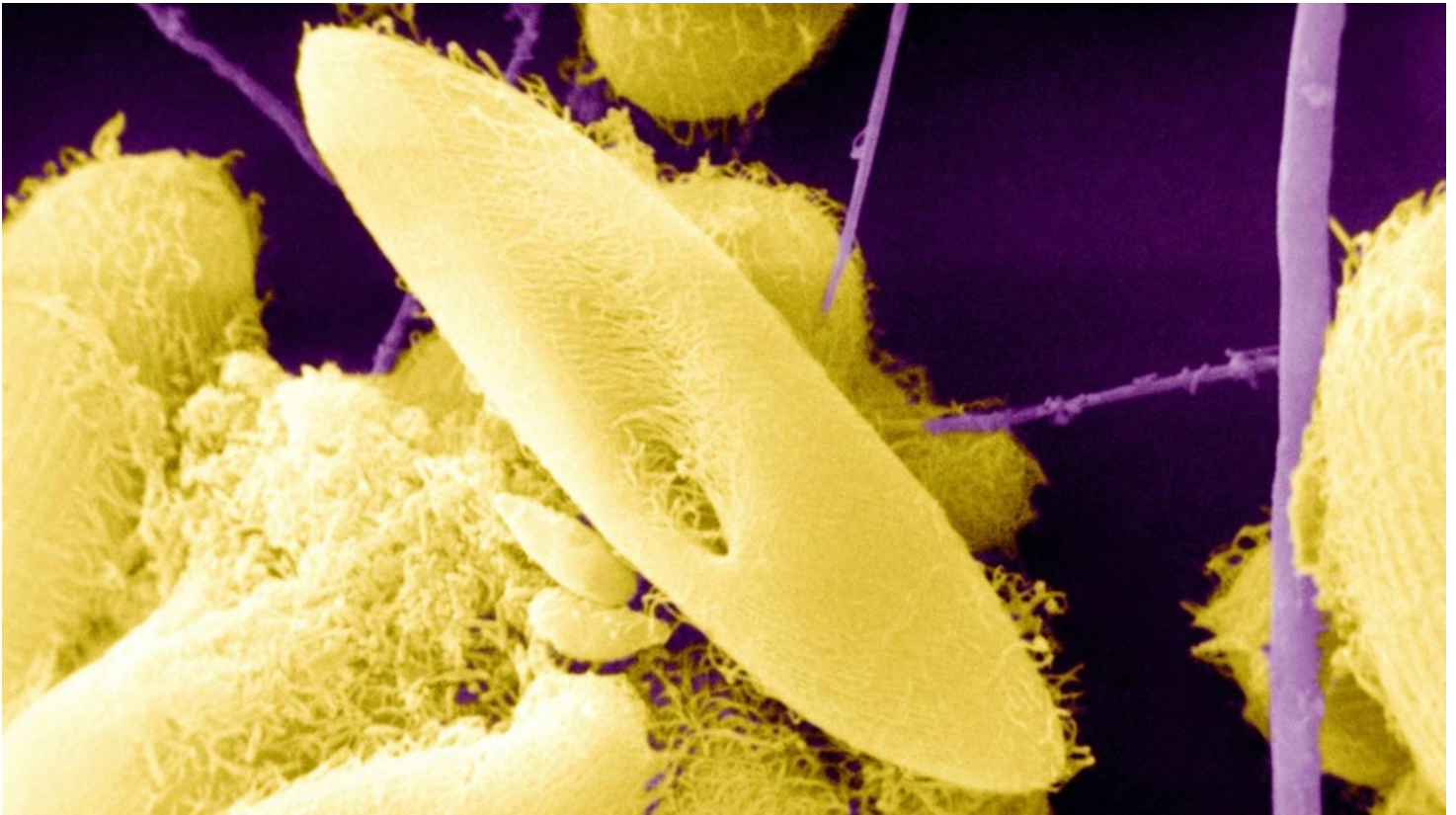


Image 1. Microscopic view of paramecia, single-celled organisms often found in ponds. Paramecia feed on other small organisms, such as bacteria. Each component of these tiny creatures, from the genetic material in its nucleus to the cilia it uses to swim, performs special functions that allow it to survive. Photo by: BSIP/UIG Via Getty Images

Life begins with the cell.

A cell is a tiny life form. It is the basic building block of living things. Each cell is made of smaller parts and can perform many different tasks. This is true for tiny bacteria. It is also true for human beings. We are made up of trillions of cells.



## **Bacteria: One Single Cell**

Cells get rid of waste. They help repair tissues. They create the energy that keeps us alive.

Some organisms consist of a single cell. They have just the most basic cell parts: DNA, ribosomes, cytoplasm and a cell membrane.

Bacteria have just these basic cell parts. They seem small and simple, but bacteria can cause serious human illnesses. Food poisoning and deadly tuberculosis are examples.

Other types of bacteria keep us healthy. Many live in the human gut. They help us digest food.

### Gene Transfer

Genes are found in our DNA. They are passed from parents to their children. They are tiny codes that tell our bodies how to grow and work.

Genetic material can have sections that move around. This allows bacteria to exchange bits of DNA. This is called horizontal gene transfer.

In vertical gene transfer, a parent passes on DNA to children. Horizontal gene transfer is different. Genetic material moves from one living thing to another. It does not matter how these organisms are related.

Horizontal gene transfer is more common in single-celled organisms. It helps bacteria against antibiotics. Humans use antibiotics to fight unwanted bacteria. Not all bacteria get killed, though. Some bacteria have genes that let them survive. Thanks to horizontal gene transfer, they can pass these genes to others.

Bacteria are a type of cell called prokaryotic. Prokaryotic cells do not have nuclear membranes. That means their DNA is not protected. That's why it's easy for them to carry out horizontal gene transfer.

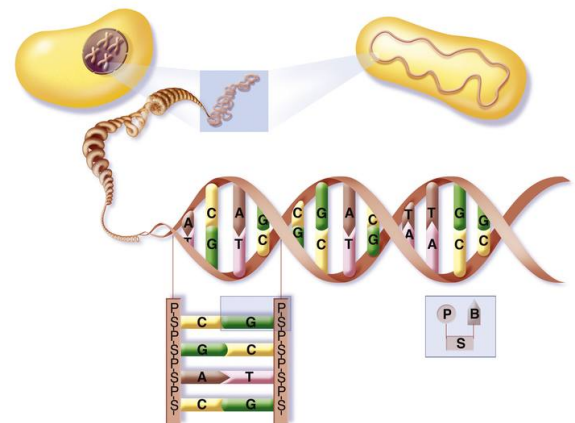
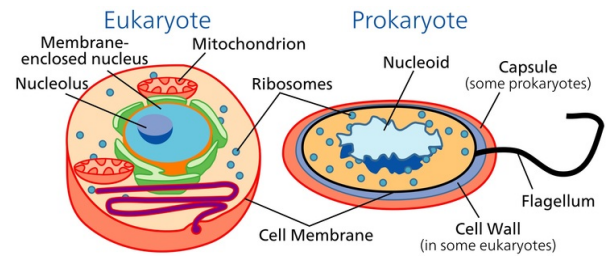
### Yeast And Fermentation

Other types of cells are called eukaryotic. A eukaryotic cell contains a nucleus. A cell's nucleus is a bit like its control center. A eukaryotic cell also has other organelles, or smaller parts. Organelles are like the cell's organs. They are parts of the cell that are in charge of special tasks.

Yeast is one example of a eukaryotic cell. The organelles in yeast allow it to ferment. Humans have long used fermentation to make bread, wine and beer. Certain enzymes within yeast allow it to change sugars into alcohol. Enzymes are proteins. Like all proteins, they are made by ribosomes within a cell.

### Amoebae

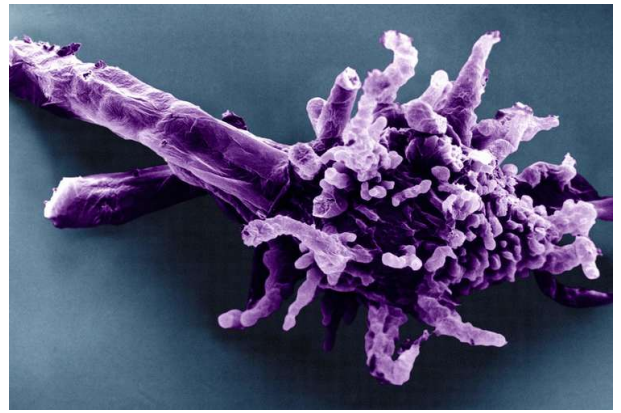
Other single-celled organisms can combine with one another. They form a multicellular body. One example is the cellular slime mold. This is a type of amoeba. When there aren't many nutrients in the environment, these cells band together. They create a slug-like form. Together, they migrate in search of food.



Many cell parts play a role in amoebae. One example is the mitochondria. These are critical to cell movement. They also help organize the cells.

### **Plants And Animals: Specialized Cells**

Plants and animals are called multicellular organisms. So are humans. They have many cells. The cells are specialized with various jobs. This allows organelles to do incredible feats. Chloroplasts in plant cells allow the plant to grab the sun's energy. Then it can produce food.



When an animal forms inside its mother, the cytoskeleton gets to work. It sorts out the important parts within the cell. It defines which end of the cell is which.

Once an animal has grown, its cells work together to support the body. Take red blood cells in mammals, for example. They have no nucleus. This helps clear out as much space as possible for a protein called hemoglobin. This protein allows the cell to carry oxygen from the lungs to the rest of the body. Humans are also mammals with red blood cells that carry oxygen throughout our body.

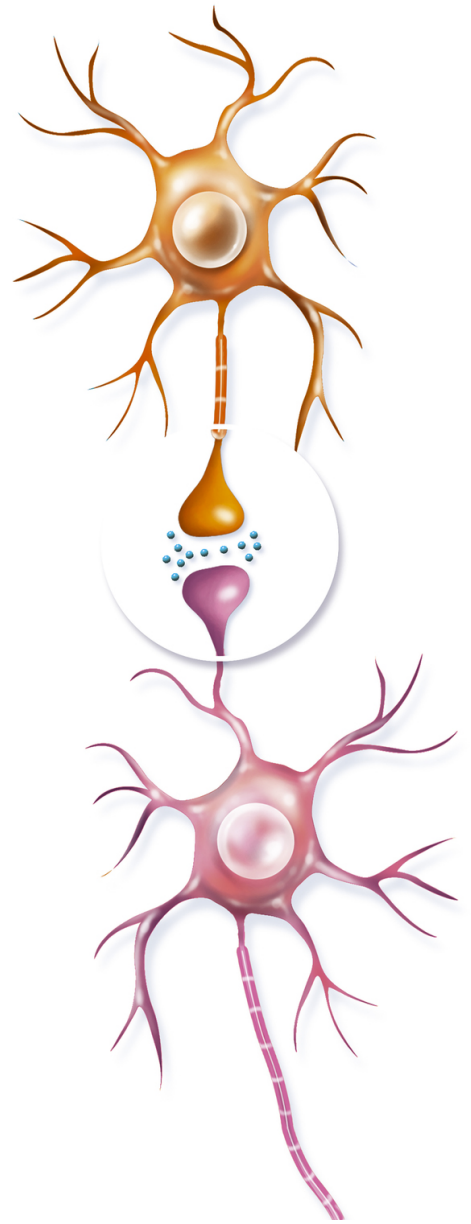
White blood cells are part of the body's immune system. The immune system is a group of body parts that keep the body healthy. White blood cells use lysosomes to destroy bacteria. This helps to stop infections and diseases.

### **Neurons And The Brain**

Neurons are the cells in the human brain. They allow us to think, solve problems and remember things.

Neurons communicate with the body. They send and receive chemical signals. The chemicals are called neurotransmitters. For example, the brain might get a feeling of pain. Then, organelles called Golgi bodies release the neurotransmitters.

Neurons have a long arm, called an axon. They send signals out through their axons. Neurons receive signals from other cells through their dendrites. These are finger-like catchers.



## Quiz

1 Read the selection from the section "Gene Transfer."

*Genetic material can have sections that move around. This allows bacteria to exchange bits of DNA. This is called horizontal gene transfer.*

What does the word "exchange" mean in this selection?

- (A) share
- (B) play
- (C) smell
- (D) destroy

2 Read the following paragraph from the section "Amoebae."

*Many cell parts play a role in amoebae. One example is the mitochondria. These are critical to cell movement. They also help organize the cells.*

Which word could replace "critical" WITHOUT changing the meaning of the sentence?

- (A) harmful
- (B) important
- (C) difficult
- (D) boring

3 How does Image 5 help the reader understand how neurons work?

- (A) It names the parts of the neurons.
- (B) It names the chemicals in the neurons.
- (C) It shows where neurons are in the body.
- (D) It shows how neurons transfer signals.

4 How does Image 2 help the reader understand cells?

- (A) It shows how the cells in the brain work.
- (B) It shows a picture of cells in a microscope.
- (C) It shows how many cells are inside the body.
- (D) It shows two different cell types and their parts.