

Getting to Know: Prokaryotic Cells

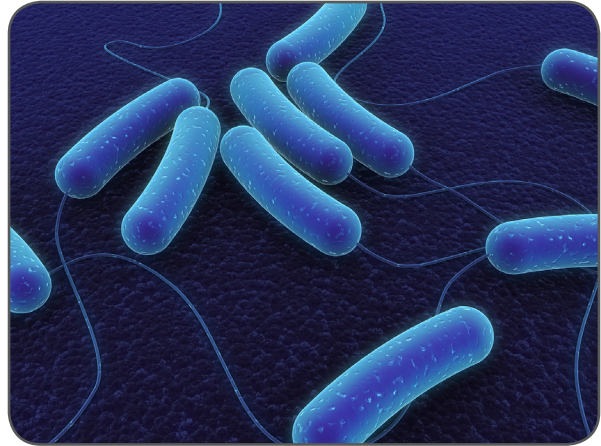
Although they are tiny, bacteria are some of the most successful organisms on Earth. They can thrive in the most extreme conditions you can imagine—bacteria can live in dangerously acidic hot springs, in radioactive mineral deposits, or in frozen polar lakes. One of the reasons why bacteria are so successful in such extreme environments is that they have a very simple cell structure. Read on to find out more about prokaryotic cells.

What exactly are bacteria?

Bacteria are all single-celled prokaryotic organisms. There are many different species of bacteria. Some bacteria live inside the bodies of other organisms. Others live freely in the environment.

The bodies of humans and other multicellular organisms are made up of eukaryotic cells. *Eukaryotic cells* have a nucleus and organelles to perform specific functions. On the other hand, *prokaryotic cells* are simpler and much smaller than the eukaryotic cells.

They do not have a nucleus or organelles. Prokaryotic cells cannot form specialized tissues or other structures, and all prokaryotic organisms are single-celled.



Bacteria are much simpler and much smaller than the eukaryotic cells that make up our bodies.



Misconception 1: *There is no such thing as friendly bacteria. All bacteria make us sick, right?*

That is wrong. In fact, the vast majority of bacteria is not harmful to people. We depend on bacteria for the good health and functioning of our bodies. Believe it or not, our bodies contain ten times the number of bacteria than human body cells! Bacteria are much smaller than human cells. Nevertheless, bacteria help our bodies in many ways. They help us get nutrients from foods. They also help us fight off other harmful bacteria.

Are prokaryotic cells completely different from eukaryotic cells?

There are many differences, but they do share some important features. Prokaryotic cells contain genetic material in the form of DNA, just like eukaryotic cells. Prokaryotic cells also have the basic structure of cytoplasm surrounded by a protective coating. Like eukaryotic cells, prokaryotic cells reproduce by dividing.

The main difference is that prokaryotic cells lack internal membranes. Therefore, they don't have any membrane-bound organelles inside the cell. They lack the familiar features of eukaryotic cells such as vacuoles, mitochondria, and a nucleus.



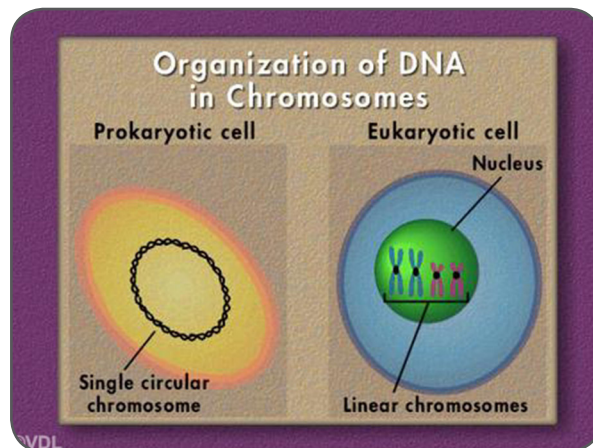
Misconception 2: *Wait, I thought all cells have a nucleus.*

Prokaryotic cells do not have a nucleus. The DNA in a prokaryotic cell is arranged in a single circular chromosome that floats freely in the cytoplasm. This is different than the arrangement of DNA in a eukaryotic cell, which forms linear chromosomes that are protected inside a nucleus.

Do prokaryotes have any special structures?

Prokaryotes have some simple structures. For example, some prokaryotes have simple structures for moving, like flagella. Some bacteria have a special protective coating called a capsule. Some prokaryotes contain very simple compartments inside the cell that function like primitive organelles. They are formed by simple proteins rather than membranes.

Now you know a little more about prokaryotic cells. Get ready to learn more fascinating details as we begin the lesson.



The DNA in a prokaryotic cell forms a circular membrane that floats freely in the cytoplasm. Prokaryotic cells lack the nucleus that surrounds the chromosomes of eukaryotic cells.