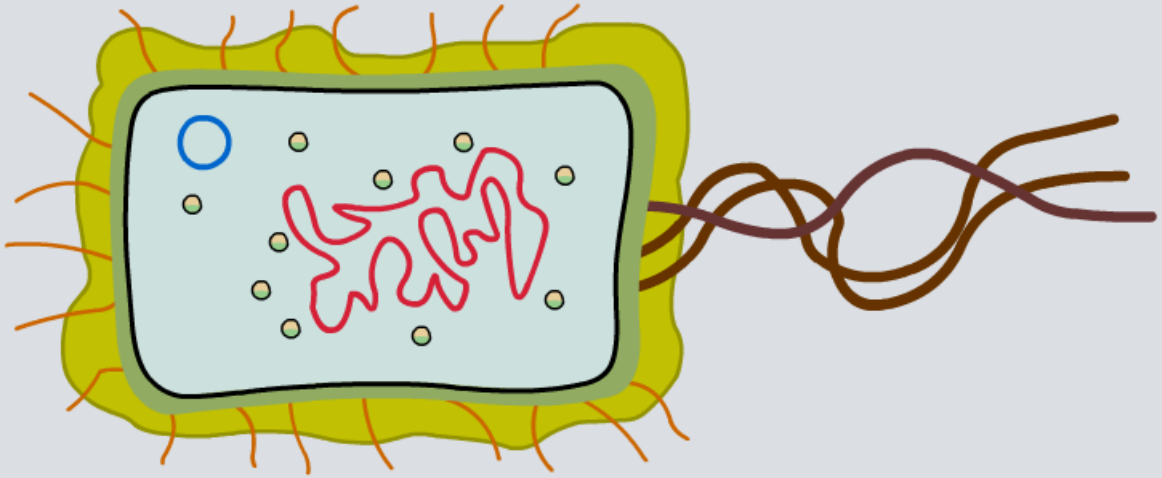
Prokaryotic Cells



What is a prokaryote?

A **prokaryote** is any organism – usually single-celled – whose DNA is suspended freely in the cytoplasm. The word means "before the nucleus".

Prokaryotes can be divided into two groups:

- **bacteria**
- **archaea**.

Prokaryotes have simpler structure than eukaryotes, lacking organelles such as the nucleus, ER and Golgi.

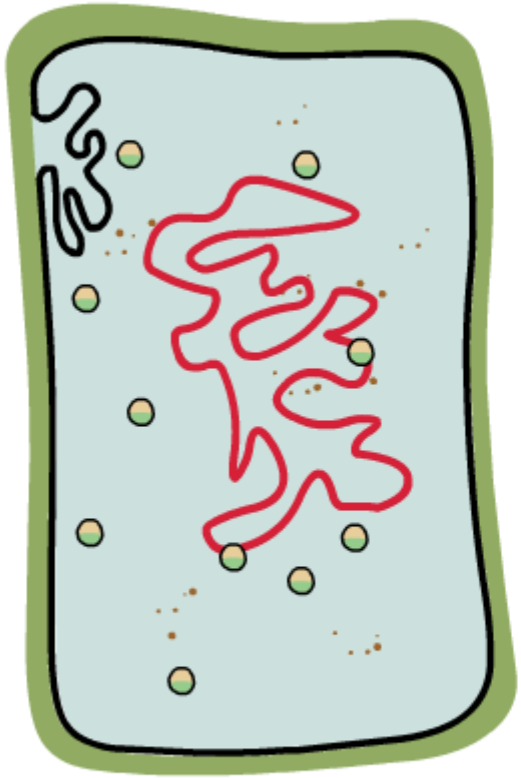
Features of the bacteria and archaea

What do all prokaryotic cells have in common?

The prokaryotic cell

All prokaryotes share the same basic structure.

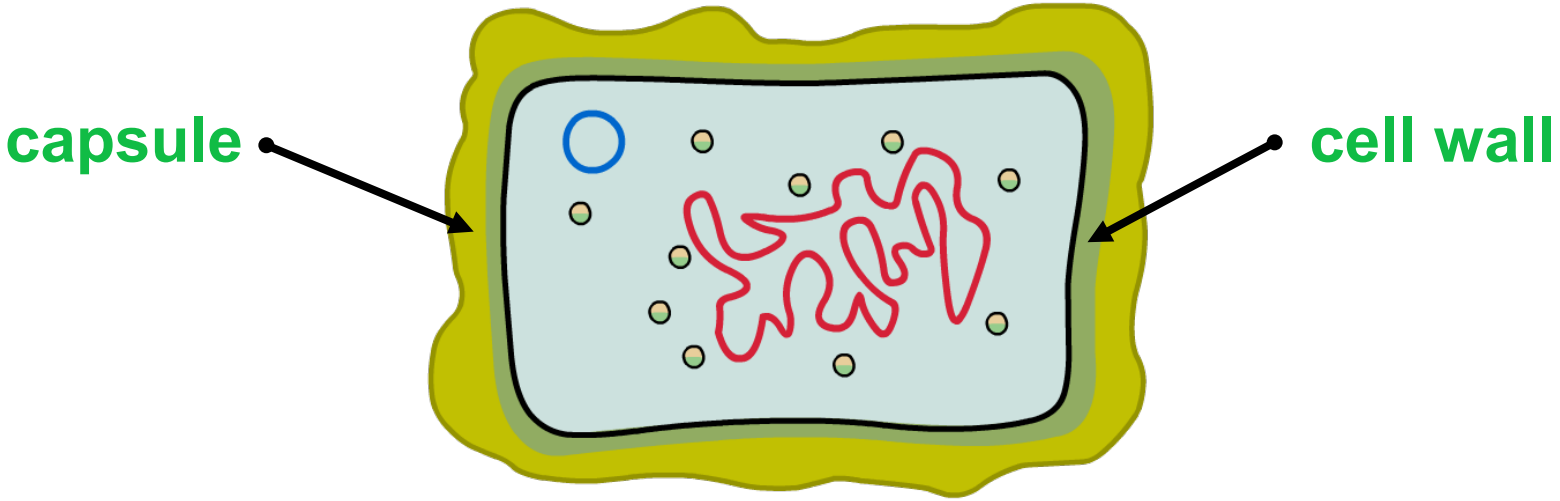
Click on a button for more information.



- DNA
- ribosomes
- cytoplasm
- cell membrane
- cell wall
- mesosome

Bacterial capsules

Many pathogenic bacteria are surrounded by a mucous-like protective layer called a **capsule**.

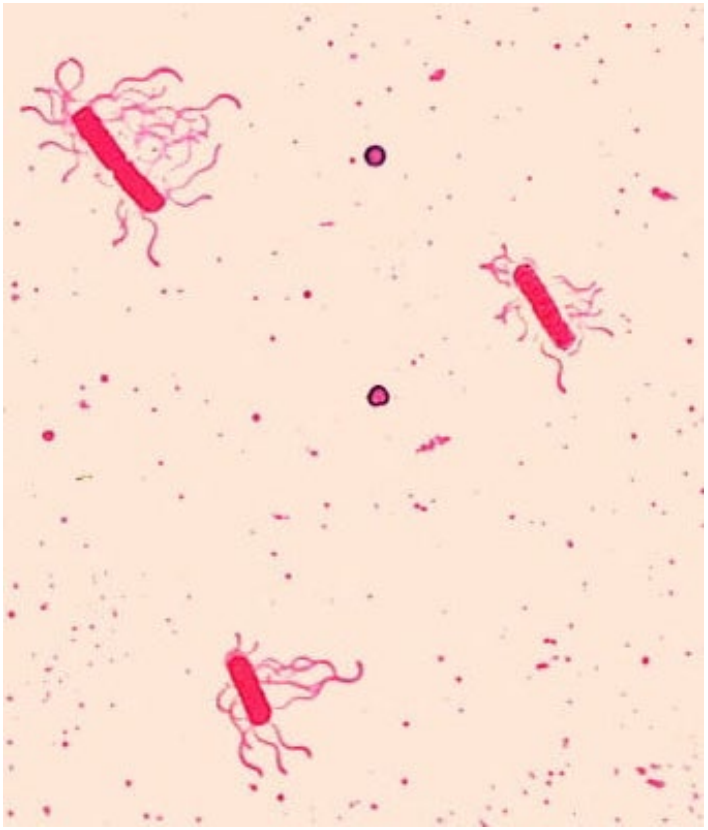


The capsule protects bacteria from viruses, or attack from a host organism's immune system, by hiding antigens on the cell surface.

The capsule is usually composed of polysaccharides, and also contains water to protect against desiccation (drying out).

Flagella and pili

Some prokaryotic cells feature one or more **flagella**. These are long helical tubes extending out of the cell wall, which rotate to provide locomotion.



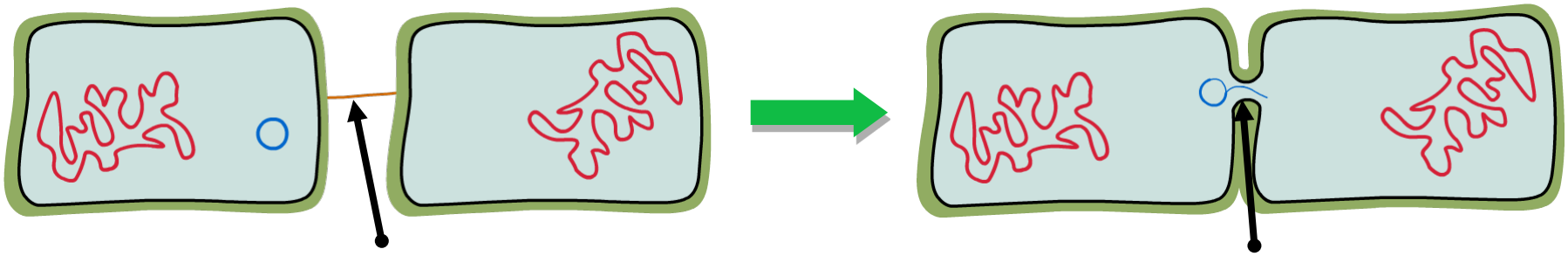
Flagella are powered by protein motors and can propel bacteria at a rate of more than 50 lengths per second.

Many bacteria also feature **pili**. These are hollow protein structures used during **bacterial conjugation** – the transfer of genetic material from one bacterium to another.

Plasmids

Bacterial cells often contain several **plasmids** – small continuous loops of DNA.

Plasmids are replicated independently of a bacterium's genophore (e.g. during **bacterial conjugation**), and may confer an advantage, such as antibiotic resistance.



pilus draws bacteria together

replication of plasmid

Plasmids are commonly used in genetic engineering to make copies of genes or large quantities of proteins or hormones.

Structure of a bacterium

What are the features of this bacterium?