

Name: _____

Date: _____ Per: _____

Prokaryotic Cells

Use the diagram and the article provided to fill in the structure and function chart below

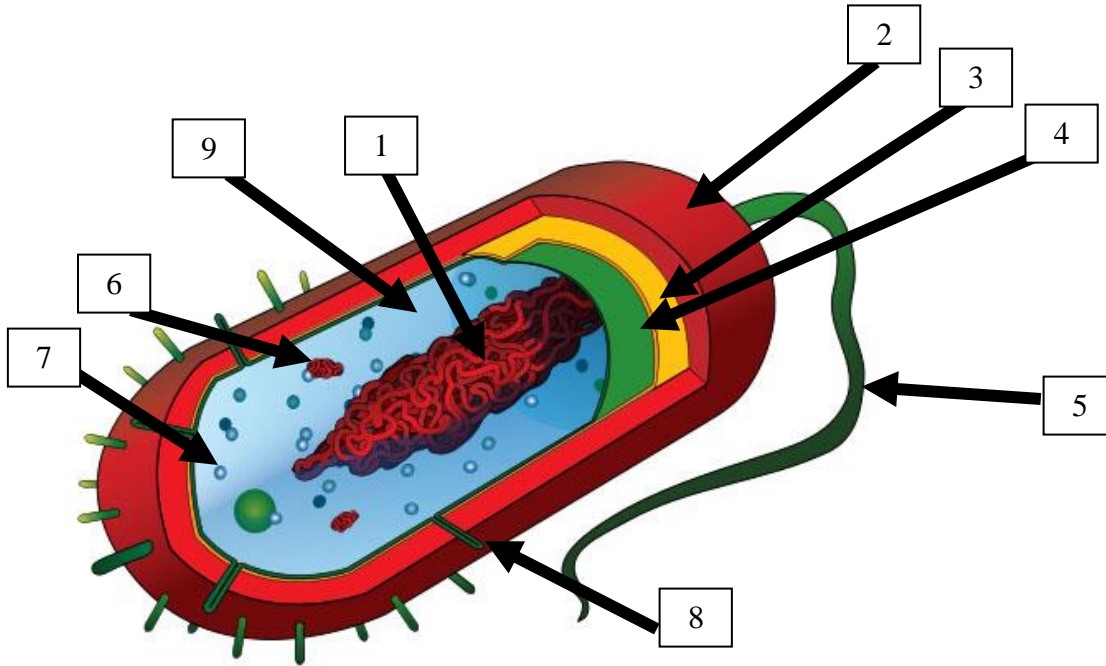


Image:
Prokaryotic
Cell by
Mariana Ruiz

Structure	Function
1	
2	
3 Cell Wall	
4	
5	
6 Plasmid	
7 Ribosome	
8 Pili	
9	

What are examples of Prokaryotic Cells?

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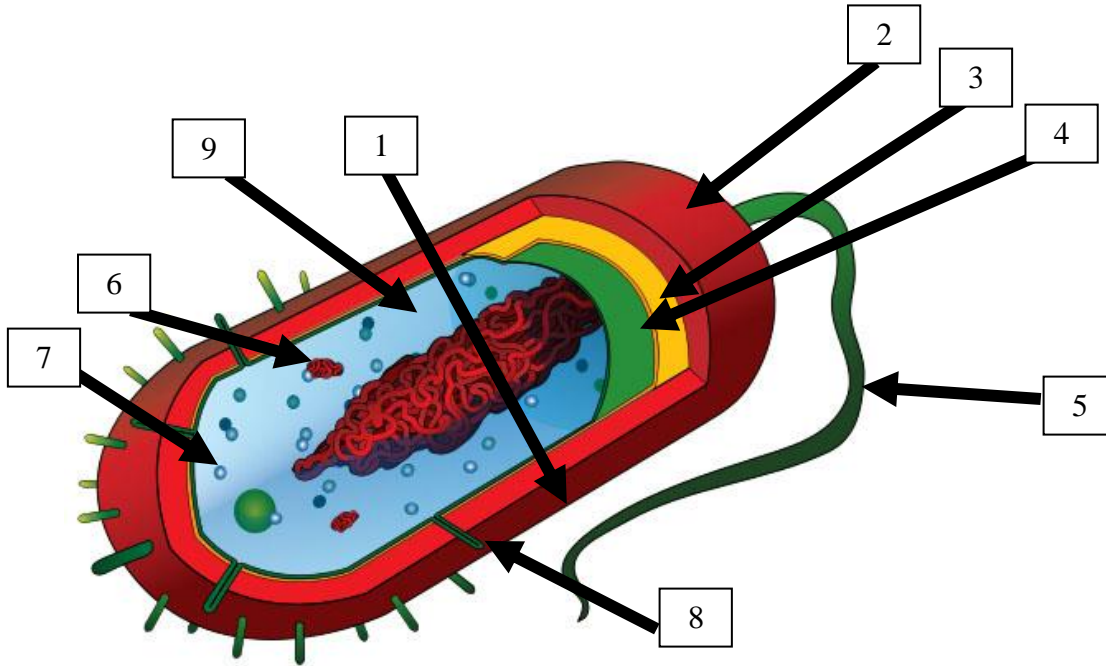


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PROKARYOTIC CELLS

The vast majority of cells on Earth are actually **prokaryotic**, so we are in the minority. Do you feel outnumbered?

If it weren't so ugly, it would be kind of cute:

There are two major kinds of prokaryotes: **Bacteria and Archaea (single-celled organisms)**

As you may have read earlier in this unit, biologists now estimate that each human being carries nearly **20 times** more bacterial, or prokaryotic, cells in his or her body than human, or eukaryotic, cells. If that statistic overwhelms you, rest assured that most of these bacteria are trying to help, and not hurt, you. Numerically, at minimum, there are 20 times more prokaryotic cells on Earth than there are eukaryotic cells. This is only a minimum estimate because there are trillions of trillions of bacterial cells that are not associated with eukaryotic organisms. In addition, all Archaea are also prokaryotic. As is the case for bacteria, it is unknown how many Archaeal cells are on Earth, but the number is sure to be astronomical. In all, eukaryotic cells make up only a very small fraction of the total number of cells on Earth. So who runs this place, anyway?

There are four main structures shared by all prokaryotic cells, bacterial or Archaeal: **The plasma membrane, Cytoplasm, Ribosomes, Genetic material (DNA and RNA)** Some prokaryotic cells also have other structures like the **cell wall, pili** (singular pillus), and **flagella** (singular flagellum). Each of these structures and cellular components plays a critical role in the growth, survival, and reproduction of prokaryotic cells.

Internal Structures of Prokaryotic Cells

Plasma Membrane: The plasma membrane is a double-layer of phospholipids with associated proteins and other molecules. It is essentially the “bag” that holds all of the intracellular (inside the cell) material and regulates (controls) the movement of materials into and out of the cell.

Cytoplasm: This is the gel-like fluid that the cell is filled with, inside the plasma membrane--liquid with all of the cellular organelles suspended within.

Ribosomes: All cells, both prokaryotic and eukaryotic, have multiple ribosomes within. Ribosomes are the tiny protein-making machines of the cell

Genetic Material of Prokaryotes

Nucleoid: The nucleoid is the region of the prokaryotic cytoplasm that contains the genome—the main genetic material (DNA) of the cell. Bacteria and Archaeans typically have a single, circular chromosome.

Plasmids: circular pieces of DNA that are easily passed from cell to cell. This is what causes bacteria to become antibiotic resistant

Prokaryotic Cell Structures Outside of Plasma Membrane

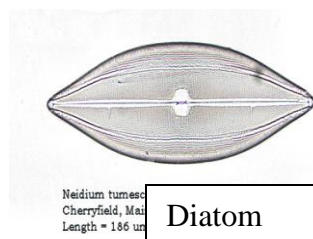
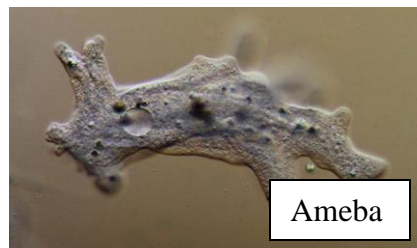
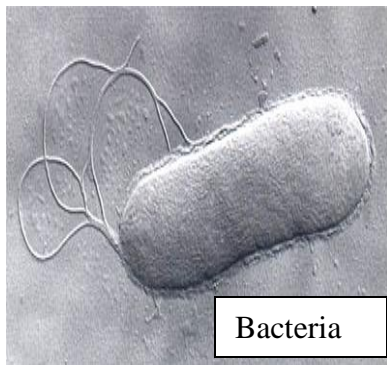
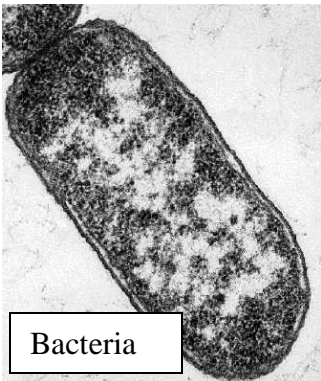
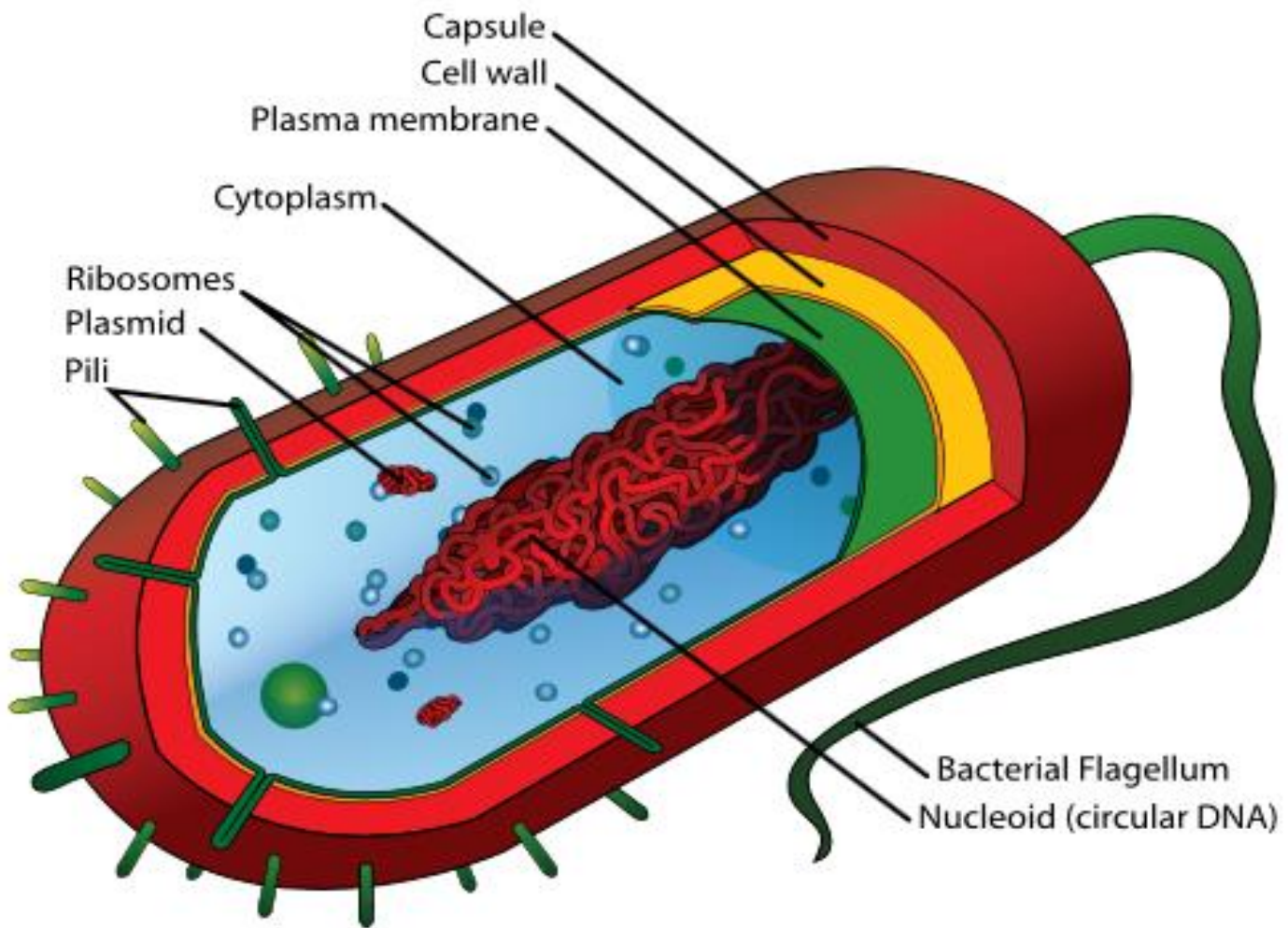
Cell Wall: Nearly all prokaryotes have a protective cell wall that prevents them from bursting in a hypotonic environment (an aqueous (water) environment with a lower concentration of solutes (salts & other materials) than are found within the cell). The composition of cell walls vary depending on the type of organisms, but most cell walls contain a combination of the major organic molecules—proteins, carbohydrates and lipids. Bacteria have a unique molecule called peptidoglycan in their cell wall.

Capsule: The outer layer of some prokaryotic cells is a gummy or slimy covering (it is sometimes labeled as the “Slime capsule”) that may help bacteria stay together in colonies and/or provide some protection.

Pili: help bacteria stick to other cells. They are short and "hairlike" and are used in reproduction.

Flagellum: are long projections composed of protein that can be used for movement

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