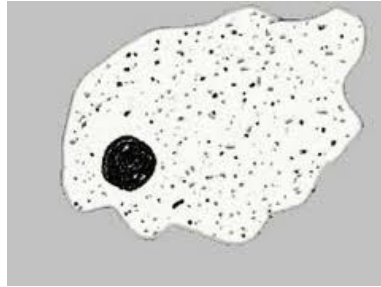


Elephant



Amoeba



The cell was discovered by [Robert Hooke](#) in 1665

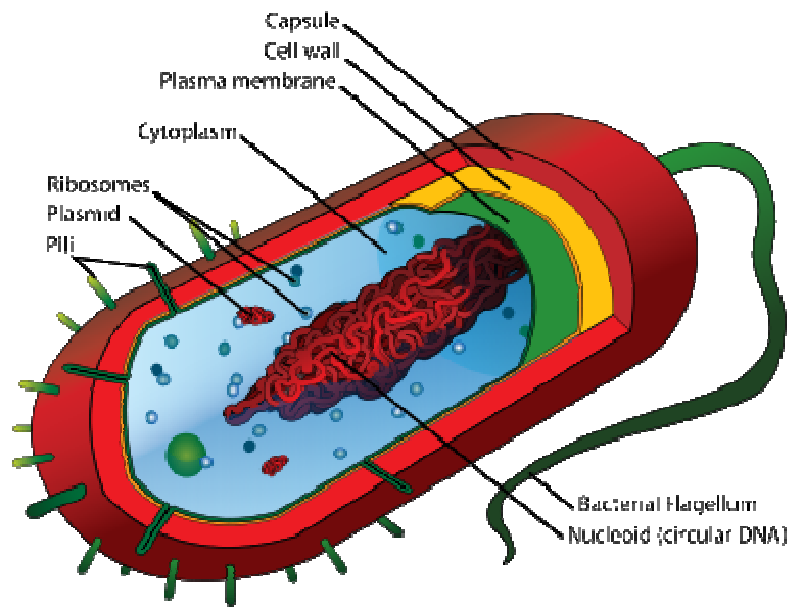
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Anatomy

There are two types of cells: eukaryotic and prokaryotic. Prokaryotic cells are usually independent, while eukaryotic cells are often found in multicellular organisms.

Prokaryotic cells

Main article: [Prokaryote](#)



 Diagram of a typical [prokaryotic](#) cell

The [prokaryote](#) cell is simpler, and therefore smaller, than a eukaryote cell, lacking a [nucleus](#) and most of the other [organelles](#) of eukaryotes. There are two kinds of prokaryotes: [bacteria](#) and [archaea](#); these share a similar structure.

Nuclear material of prokaryotic cell consist of a single chromosome that is in direct contact with cytoplasm. Here, the undefined nuclear region in the cytoplasm is called [nucleoid](#).

A prokaryotic cell has three architectural regions:

- On the outside, [flagella](#) and [pili](#) project from the cell's surface. These are structures (not present in all prokaryotes) made of proteins that facilitate movement and communication between cells;
- Enclosing the cell is the [cell envelope](#) – generally consisting of a [cell wall](#) covering a [plasma membrane](#) though some bacteria also have a further covering layer called a [capsule](#). The envelope gives rigidity to the cell and separates the interior of the cell from its environment, serving as a protective filter. Though most prokaryotes have a cell wall, there are exceptions such as *Mycoplasma* (bacteria) and *Thermoplasma* (archaea). The cell wall consists of [peptidoglycan](#) in bacteria, and acts as an additional barrier against exterior forces. It also prevents the cell from expanding and finally bursting ([cytolysis](#)) from [osmotic pressure](#) against a [hypotonic](#) environment. Some eukaryote cells ([plant cells](#) and [fungi](#) cells) also have a cell wall;
- Inside the cell is the [cytoplasmic region](#) that contains the [cell genome](#) (DNA) and ribosomes and various sorts of inclusions. A [prokaryotic chromosome](#) is usually a circular molecule (an exception is that of the bacterium *Borrelia burgdorferi*, which causes Lyme disease). Though not forming a *nucleus*, the [DNA](#) is condensed in a

nucleoid. Prokaryotes can carry [extrachromosomal DNA](#) elements called [plasmids](#), which are usually circular. Plasmids enable additional functions, such as [antibiotic resistance](#).

Eukaryotic cells

Main article: [Eukaryote](#)

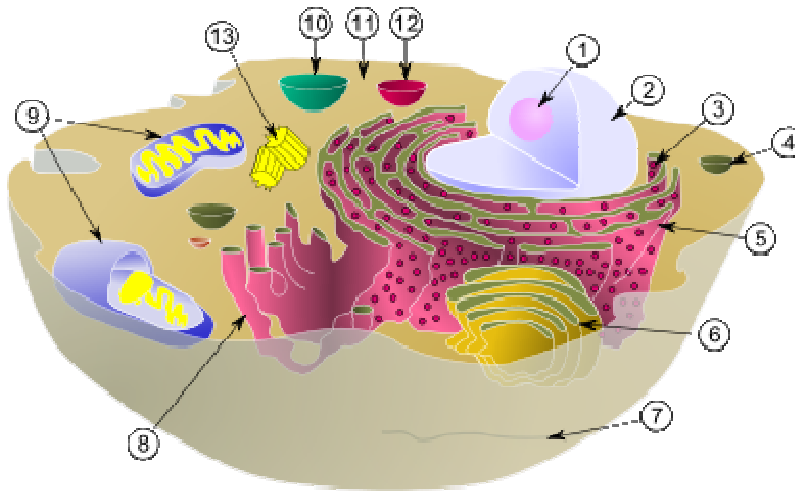


Diagram of a typical [animal \(eukaryotic\)](#) cell, showing subcellular components. [Organelles](#):

- (1) [nucleolus](#)
- (2) [nucleus](#)
- (3) [ribosome](#)
- (4) [vesicle](#)
- (5) [rough endoplasmic reticulum](#) (ER)
- (6) [Golgi apparatus](#)
- (7) [Cytoskeleton](#)
- (8) [smooth endoplasmic reticulum](#)
- (9) [mitochondria](#)
- (10) [vacuole](#)
- (11) [cytoplasm](#)
- (12) [lysosome](#)
- (13) [centrioles](#) within [centrosome](#)

[Eukaryotic](#) cells are about 15 times wider than a typical prokaryote and can be as much as 1000 times greater in volume. The major difference between prokaryotes and eukaryotes is that eukaryotic cells contain membrane-bound compartments in which specific metabolic activities take place. Most important among these is a [cell nucleus](#), a membrane-delineated compartment that houses the eukaryotic cell's DNA. This nucleus gives the eukaryote its name, which means "true nucleus." Other differences include:

- The plasma membrane resembles that of prokaryotes in function, with minor differences in the setup. Cell walls may or may not be present.
- The eukaryotic DNA is organized in one or more linear molecules, called [chromosomes](#), which are associated with [histone](#) proteins. All chromosomal DNA is stored in the [cell](#)

[nucleus](#), separated from the cytoplasm by a membrane. Some eukaryotic [organelles](#) such as [mitochondria](#) also contain some DNA.

- Many eukaryotic cells are [ciliated](#) with *primary cilia*. Primary cilia play important roles in chemosensation, [mechanosensation](#), and thermosensation. Cilia may thus be "viewed as sensory cellular [antennae](#) that coordinate a large number of cellular signaling pathways, sometimes coupling the signaling to ciliary motility or alternatively to cell division and differentiation."^[7]
- Eukaryotes can move using *motile cilia* or *flagella*. The flagella are more complex than those of prokaryotes.