

Eukaryotic Cells

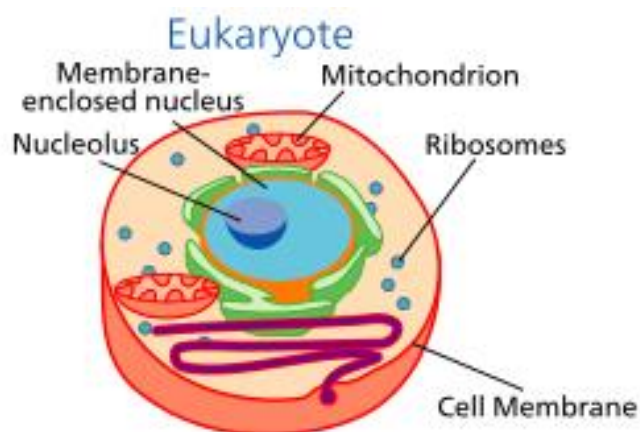
Eukaryotes are organisms that are made up of eukaryotic cells. Eukaryotic cells were the first cells to appear on earth that had specialised internal compartments. Eukaryotic cells evolved about 2.5 billion years ago, and eukaryotic cells are defined by **having a nucleus**.

The specialized internal compartments that are found in eukaryotic cells are known as “**organelles**” meaning “little organs”. There are many different organelles in eukaryotic cells, and they are defined as a structure that carries out specific activities in the cell. These organelles are membrane-bound (i.e. surrounded by their own little membrane) to allow their functions to work quickly and efficiently. Examples of organelles are mitochondria, vacuoles, and chloroplasts.

Eukaryotic cells are very large in comparison to other types of cells (about 10 μm). Eukaryotic cells are also very complex compared to other cells because they contain many specialised organelles that each has a specific function. Though all cells have DNA, eukaryotic cells are the only cell type that has an organelle known as the nucleus (as mentioned above). The nucleus houses and protects the DNA.

Eukaryotic cells have extra stuff going on and extra parts attached. Since they have organelles and organized DNA they are able to create parts. One example is the flagellum (a tail-like structure to help it move). They could also create cilia (little hairs that help scoot the cell through the water). In the invertebrate section, we talk about nematocysts that are cells with little harpoons for catching prey. The list is endless.

Examples of eukaryotic cells are animal cells, plant cells, fungal cells and some protists such as paramecium.



Prokaryotic Cells

Prokaryotes are organisms that are composed of prokaryotic cells. Prokaryotes are the smallest and simplest cells. A prokaryote is a single-celled organism (or called a 'unicellular organism') that **lacks a nucleus** and other internal compartments. Because prokaryotes lack many specialised internal compartments (**organelles**), they cannot carry out many specialised functions (hence why they are simpler), and because they lack these structures, they are much smaller than eukaryotes (their size is usually about 0.5-2 μm). Although prokaryotes have no organelles, they do have ribosomes for protein synthesis floating in their cytoplasm.

Although they are very simple organisms, they are found everywhere on the planet. Some scientists even think that they may be found on other planets (maybe even Mars).

Prokaryotes are the most primitive of cells (meaning they are the oldest and simplest), and they lived at least 3.5 billion years ago. For nearly 2 billion years, prokaryotes were the only organisms on Earth. The most familiar example of prokaryotes is bacteria. Some places you can find bacteria every day are in your intestines, a cup of natural yogurt, or a bakery.

Many (not all) prokaryotes also have a flagella, which are long, threadlike structures that protrude from the cell's surface to enable the cell to move at faster speeds.

The cell wall is often times covered by a capsule which is very sticky, and allows the prokaryote to stick to teeth, skin, food, intestines, etc. Prokaryotes may also have a pilus, which are sticky projections.

The DNA shape of prokaryotes is different than eukaryotes because it consists of a single, circular molecule of DNA. The DNA is also free and loose within the cell because **it is not housed in a nucleus** (remember, one of the most definitive features of a prokaryotic cells is the fact that it lacks a nucleus). Prokaryotes also have plasmids in their cytoplasm, which are circular DNA molecules. These can be very advantageous as bacteria are able to transfer their plasmids to other bacterial cells, which can give them extra characteristics such as antibiotic resistance. This cannot happen in eukaryotic cells; we cannot obtain any more DNA than the ones we were born with because eukaryotes do not have plasmid DNA.

