

# Ultra structure of Eukaryotic cell

Eukaryotic cells are the cells that are complex in structure and function as they have a membrane-bound well-defined nucleus and other membrane-bound organelles.

The term “eukaryote” is derived from Greek words, “eu” meaning ‘true’ and “karyon’ meaning ‘nucleus.’

Eukaryotic cells have a more advanced structural composition when compared to prokaryotes.

By virtue of these advancements, eukaryotic cells are capable of performing more complex functions than prokaryotic cells.

## Characteristics of Eukaryotic cells

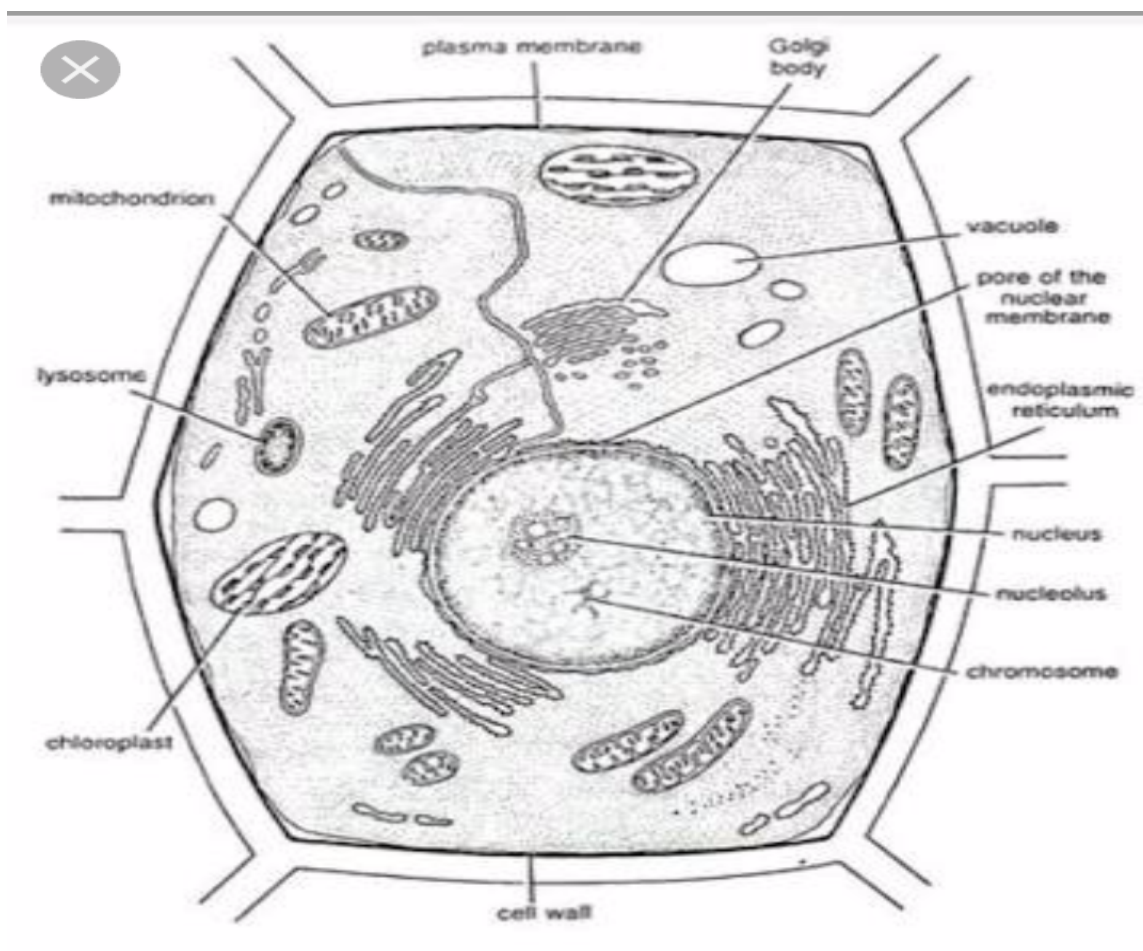
The general characteristics of eukaryotic cells are listed below:

1. The size of eukaryotic cells is significantly larger than prokaryotic cells as the size ranges from 10-100  $\mu\text{m}$  in diameter.
2. The shape of eukaryotic cells varies significantly with the type of cell. Some cells are pleiomorphic like Amoeba, whereas some have a defined shape like plant cells. The shape of the cells is highly influenced by environmental factors as well as other functional adaptations.
3. Eukaryotic cells have a more advanced cellular organization with multiple membrane-bound organelles and well-defined nucleus.
4. The genetic material of eukaryotic cells is DNA, and it is linear and has multiple origins of replication.
5. The nucleus of eukaryotic cells is surrounded by a complex nuclear membrane. The chromosomes in the nucleus are complexed with histone protein to form linear chromosomes as opposed to circular chromosomes of prokaryotes.
6. The cell wall that is present in some eukaryotic

cells is made up of cellulose or other carbohydrates.

7. Some eukaryotic cells like yeast cells reproduce asexually via mitosis or fission, whereas other cells reproduce sexually.

## .Structure (components/ parts) of Eukaryotic cell



Eukaryotic cells are much larger in size when compared with prokaryotic cells, having the volume about 10,000 times higher than prokaryotic cells. Eukaryotic cells are formed of a number of membrane-bound and membrane-less organelles that all perform together to support the cell's organization and function. The common component/ parts in eukaryotic cells are as follows:

## Cell wall

The cell wall is present in some eukaryotic cells like some protists, fungal and plant cells.

The cell wall in plants and some protists is made up of cellulose microfibrils and a network of glycans embedded in the matrix of pectin polysaccharides.

The composition of the cell wall in fungal cells is different as in fungal cells, the cell wall is composed of a different polysaccharide, chitin.

The function of the cell wall, however, is similar in eukaryotic cells. The cell wall provides support and shape to the eukaryotic cells

# Cell membrane/ Plasma membrane/ Cytoplasmic membrane

The cell membrane in eukaryotic cells is present inside the cell wall.

In cells without the cell wall, the cell membrane functions as the outermost covering that separates the internal contents of the cell from the outside environment.

The plasma membrane is made up of phospholipid bilayer with integral proteins embedded between the two layers.

The composition of the cell membrane is similar in eukaryotes and prokaryotes

## Cytoplasm

The cytoplasm of the eukaryotic cell is a fluid-filled space that accommodates all internal cell organelles and other molecules.

The cytoplasm consists of a jelly-like cytosol and a water-soluble solution containing minerals, ions and other molecules.

The amount of cytoplasm is higher in eukaryotic cells as compared to prokaryotic cells as the cell volume is more abundant in eukaryotic cells.

## Nucleus

The nucleus is an organelle present in the cytoplasm of a eukaryotic cell.

It is more complicated than the prokaryotic nucleus as the nucleus is surrounded by a nuclear membrane having a composition similar to the plasma membrane.

The genome of a eukaryotic cell is present inside the nucleus where it remains coupled with various proteins like the histone protein.

Inside the nucleus, the DNA molecules are arranged in chromosomes which are linear and more organized.

Additionally, the nucleus also houses a nucleolus

that is not surrounded by a membrane but has proteins that make up the ribosomes and rRNA.

## Ribosomes

In eukaryotic cells, the ribosomes are 80S type containing 60S and 40S subunits

## Mitochondria and Plastids

Mitochondria and plastids are membrane-bound organelles found in the cytoplasm of eukaryotic cells.

Both mitochondria and plastids have an extrachromosomal DNA that regulates the functions of the organelles.

In mitochondria, the outer membrane is made up of phospholipid bilayer, whereas the inner layer is folded into cristae where the major physiological function of the cell takes place.

Plastids are found in eukaryotic cells of plants and algae that provide color to the cell. Additionally, plastids also have a green pigment, chlorophyll, which is required for photosynthesis