Physiology

2nd stage

cell physiology

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Cell

Basic unit of all living thing that perform all common function.

Cell consist of

1. plasma membrane

It is also termed as a Cell Membrane or Cytoplasmic Membrane., which is composed of a lipid bilayer and proteins. It functions as:

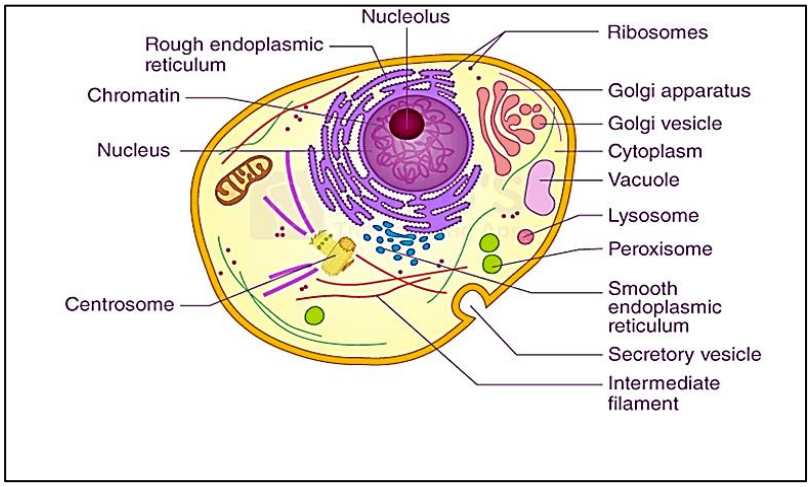
- allow the entry of selective materials in and out of the cell according to the requirement (selectively permeable membrane).
- providing shape and protects the inner contents of the cell.

2. Cytoplasm

jelly-like substances, found between the cell membrane and nucleus. They are mainly composed of water, organic and inorganic compounds. The cytoplasm is one of the essential components of the cell and all the cell organelles are embedded

Cell Organelles

All cellular components present within the cells and are distinct in their structures and functions.

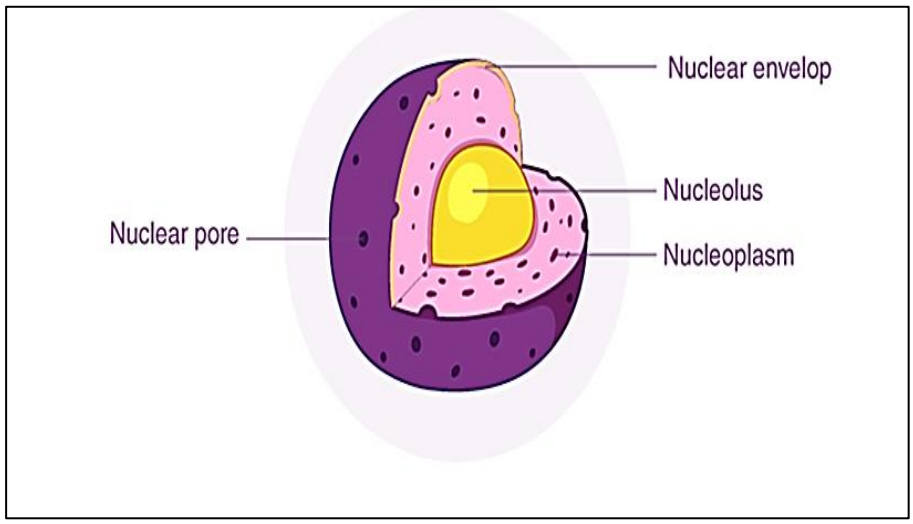


1- Nucleus

The nucleus is a double-membraned organelle found in all eukaryotic cells. It is the largest organelle, which functions as the control center of the cellular activities and is the storehouse of the cell's DNA. By structure, the nucleus is dark, round, surrounded by a nuclear membrane.

2- Nucleolus

The is a tiny spherical structure found in the cell's nucleus whose primary function is to produce and assemble the cell's ribosomes. The nucleolus is also where ribosomal RNA genes are transcribed

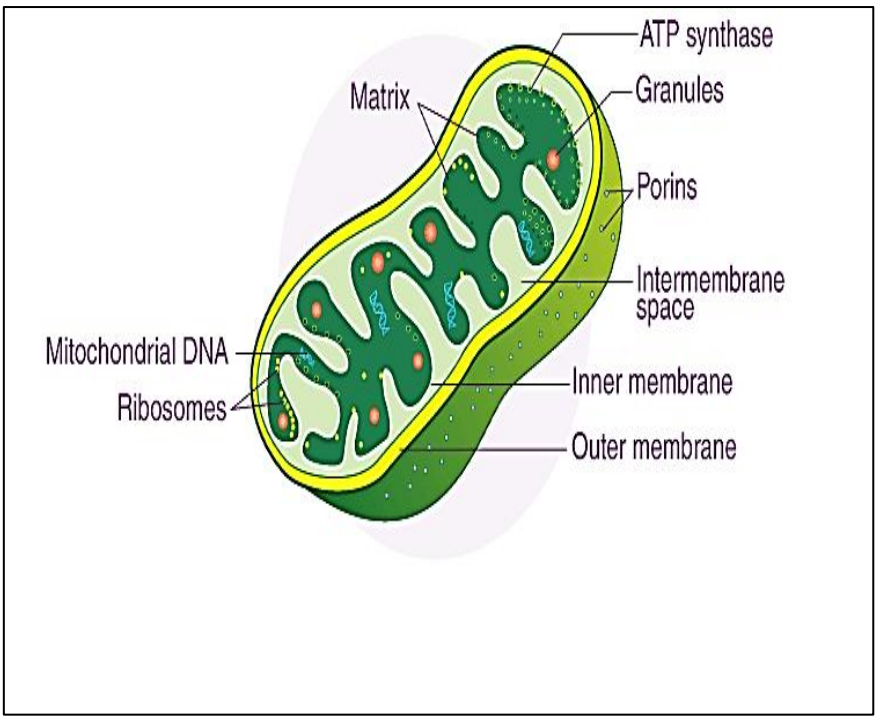


3. Mitochondria

Mitochondria are called the powerhouses of the cell as they produce energy-rich molecules for the cell. It is a double membrane-bound, sausage-shaped organelle, found in almost all eukaryotic cells.

The double membranes divide its lumen into two distinct aqueous compartments. The inner compartment is called a 'matrix' which is folded into cristae whereas the outer membrane forms a continuous boundary with the cytoplasm.

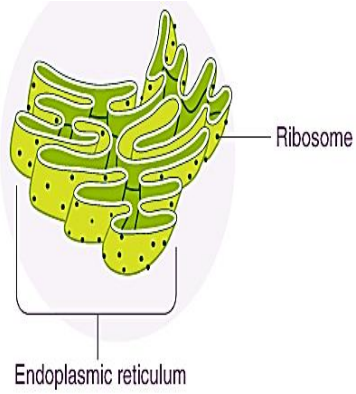
Mitochondria are the sites of **aerobic respiration** in the cell, produces energy in the form of ATP .



4. Ribosomes

A ribosome is an intercellular structure made of both RNA and protein, and it is the site of protein synthesis in the cell.

Ribosomes are specialized cell organelles and are found in both prokaryotic and eukaryotic cells. Every living cell requires ribosomes for the production of proteins.



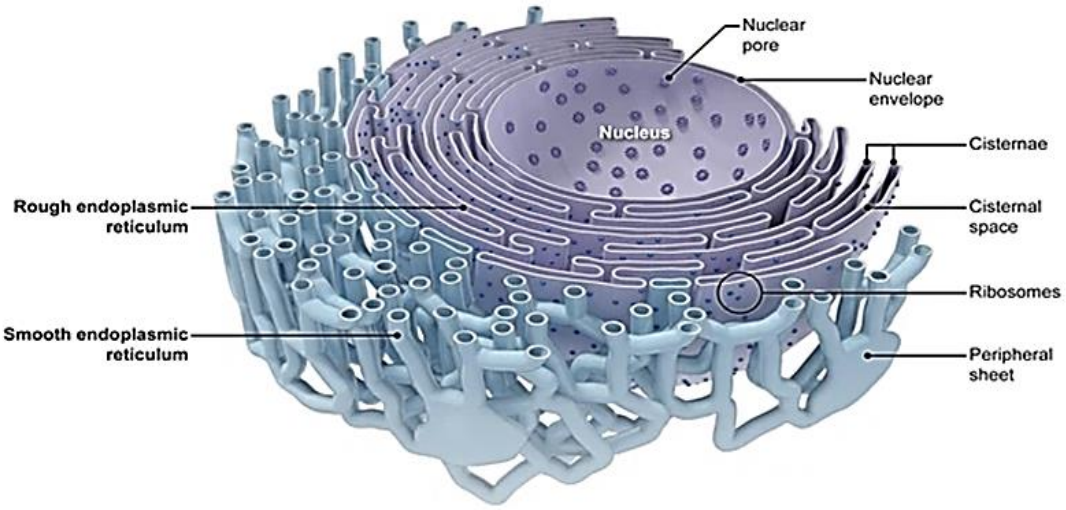
5. The endoplasmic reticulum (ER)

The endoplasmic reticulum is the largest single structure in eukaryotic cells. It consists of a range of interconnected shapes, including sheets and tubules, and comprises a lumen enclosed by a membrane that is continuous with the membrane that surrounds the nucleus of the cell.

Two types of endoplasmic reticulum.

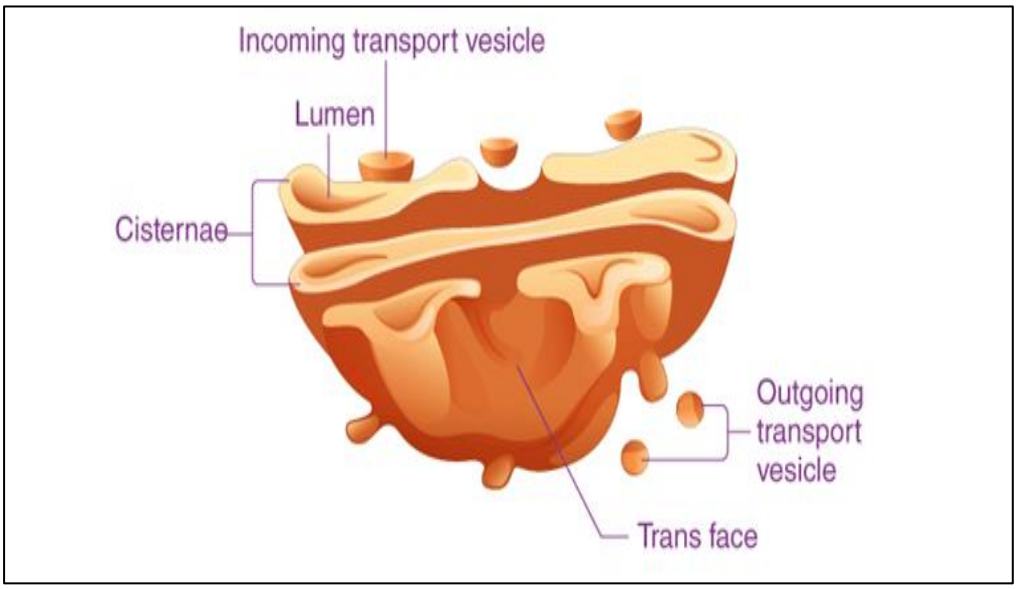
1. **Smooth endoplasmic reticulum** (without a ribosome-on their surface)
   - Smooth ER is responsible for the synthesis of essential lipids such as phospholipids and cholesterol.
   - Smooth ER is also responsible for the production and secretion of steroid hormones
   - It is also responsible for the metabolism of carbohydrates.

2. **Rough endoplasmic reticulum** (with a ribosome-on their surface)
   - The majority of the functions of rough ER is associated with protein synthesis.
   - The rough endoplasmic reticulum also plays a vital role in protein folding.
   - The second most important function after protein synthesis and protein folding is protein sorting.



6. Golgi Apparatus

Is also termed as Golgi Complex. It is a membrane-bound organelle, which is mainly composed of a series of flattened, stacked pouches called cisternae. This cell organelle is primarily responsible for transporting, modifying, and packaging proteins and lipids to targeted destinations.



7- Centrosome

Is a cellular structure involved in the process of cell division. Before cell division, the centrosome duplicates and then, as division begins, the two centrosomes move to opposite ends of the cell.