Cell Organelles - Notes

Cell theory

Cells are the basic unit of life.

1) All organisms are made up of one or more cells and the products of those cells.
2) All cells carry out life activities (require energy, grow, have a limited size).
3) New cells arise only from other living cells by the process of cell division.

THE THREE MAIN COMPONENTS OF ANY PLANT OR ANIMAL CELL ARE:

1. PLASMA MEMBRANE/ CELL MEMBRANE

Structure- a layer composed of proteins and carbohydrates. It is fluid-like.

Function - the cell membrane separates the cell from its external environment, and is selectively permeable (controls what gets in and out). It protects the cell and provides stability.

2. CYTOPLASM

Structure - The jelly-like substance composed of mainly water and found between the cell membrane and nucleus. The cytoplasm makes up most of the "body" of a cell and is constantly streaming.

3. NUCLEUS

Structure - The largest organelle in the cell. It is dark and round, and is surrounded by a double membrane called the **nuclear envelope/membrane**. In spots the nuclear envelope fuses to form pores which are selectively permeable. The nucleus contains genetic information (DNA) on special strands called **chromosomes**.

Function - The nucleus is the "control center" of the cell, for cell metabolism and reproduction.

The following organelles are found in both plant and animal cells:

1. "ER" OR ENDOPLASMIC RETICULUM

The Endoplasmic Reticulum is a network of membranous canals filled with fluid. They carry materials throughout the cell. The ER is the "transport system" of the cell.

There are two types of ER: **rough ER** and **smooth ER.**

Rough Endoplasmic Reticulum is lined with ribosomes and is rough in appearance and Smooth Endoplasmic Reticulum contains no ribosomes and is smooth in appearance.

2. RIBOSOMES

Ribosomes are small particles which are found individually in the cytoplasm and also line the membranes of the rough endoplasmic reticulum. Ribosomes produce protein. They could be thought of as "factories" in the cell.

3. GOLGI BODY / APPARATUS

Golgi bodies are stacks of flattened membranes. The Golgi Body temporarily stores protein which can then leave the cell via vesicles pinching off from the Golgi.

4. LYSOSOMES

Lysosomes are small sac-like structures surrounded by a single membrane and containing strong digestive enzymes which when released can break down worn out organelles or food. The lysosome is also known as a suicide sac.

5. MITOCHONDRIA

The mitochondria are round "tube-like" organelles that are surrounded by a double membrane, with the inner membrane being highly folded. Mitochondria are often referred to as the "powerhouse" of the cell. They release food energy to be used by the cell. This process is called respiration. Some cells (muscle cells) require more energy than other cells and so would have many more mitochondria.

6. VACUOLES

Vacuoles are fluid filled organelles enclosed by a membrane. They can store materials such as food, water, sugar, minerals and waste products.

7. NUCLEOLUS

The nucleolus is by far the most easily recognized substructure in the eukaryotic nucleus. The nucleolus is a ribosome production factory.

Organelles and other features found only in plant cells:

1. CELL WALL

The cell wall is a rigid organelle composed of cellulose and lying just outside the cell membrane. The cell wall gives the plant cell its box-like shape. It also protects the cell. The cell wall contains pores which allow materials to pass to and from the cell membrane.

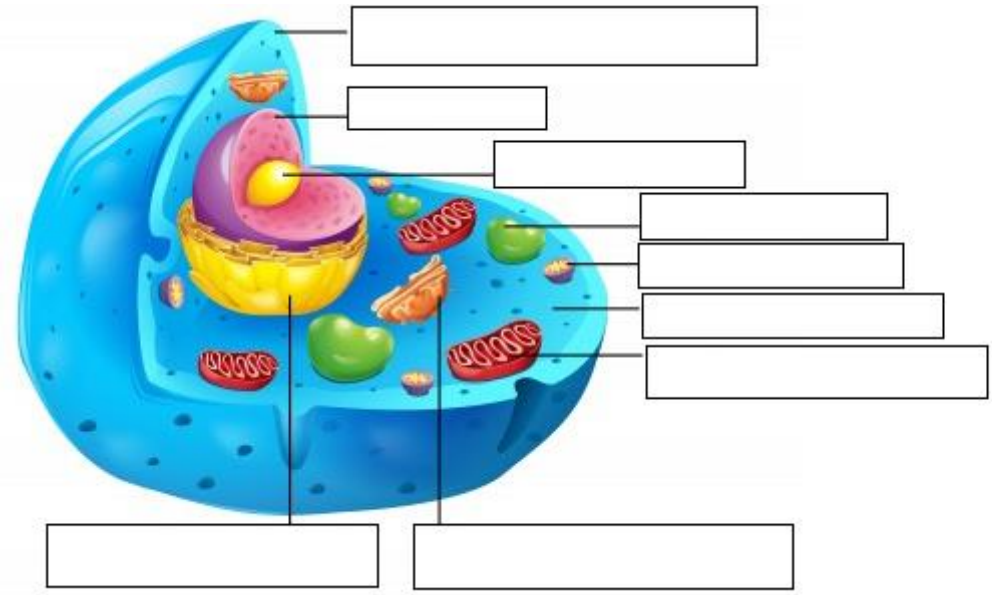
2. CHLOROPLASTS

Chloroplasts are the food producers of the cell. Chloroplasts work to convert light energy of the Sun into sugars that can be used by cells. The entire process is called **photosynthesis**.

3. CENTRAL VACUOLE

The central vacuole is a large fluid-filled vacuole found in plants. Central vacuoles are large containers. In this sense, they can be used to contain cellular waste and to isolate materials that may be harmful to the cell.

Animal Cell



Plant Cell