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Cell Membrane

- **Function**-It regulates what enters and leaves the cell (also called selective permeability) . It also gives the cell shape and protection.
- **Structure**-Made up of two layers of phospholipids with proteins embedded randomly in the layers. Lipid soluble substances, like alcohol, easily pass across the membrane by dissolving in it. Lipid insoluble substances cannot pass, and water passes through protein lined pores.

Rough Endoplasmic Reticulum

- **Function**-Primarily concerned with protein synthesis and transport. Most highly developed in protein exporting cells (eg. Liver and pancreatic cells)
- **Structure**-It is a series of interconnected membranes which spread throughout the cytoplasm forming channels of flattened sacs, with ribosomes attached to them. The channels formed by the membranes transport the proteins made by the ribosomes.

Smooth Endoplasmic Reticulum

- **Function**-synthesizes and transports lipids and steroids. Some kinds of smooth E. R. Accepts, modifies, and transports proteins from the rough E. R. And still other kinds break down energy rich glycogen and fats.
- **Structure**-The smooth E. R. Is free of ribosomes so has a smooth appearance. The channels formed are similar to those formed by the rough E. R. But are tubular and are concerned with making and transporting lipids and steroids.

Golgi Apparatus (Body)

- **Function**-Proteins exported from the rough and smooth E. R. Are modified and enclosed in secretory or lysosomal vesicles and transported out of the cell.
- **Structure**-The golgi appear as flattened stacks of membranes. The proteins enter these membranes are modified, concentrated and packaged into small spherical membrane bound structures called vesicles.

Lysosomes

- Function-digests and disposes of foreign particles, malfunctioning structures, and worn out organelles.
- Structure-The contents of the lysosome are contained within vesicles. The lysosome contains 40 or so different enzymes that are capable of breaking down virtually every large biological molecule, including DNA, RNA, proteins, and certain lipids.

Mitochondria

- Function-The chemical reactions which produce energy and the storage of that energy as ATP occur in this organelle. Glucose and Oxygen are used to produce ATP, carbon dioxide and water. Collectively these reactions are called aerobic respiration.
- Structure-The structure is characterized by a double membrane which creates two areas within the organelle. The area between the membranes houses the enzymes of the Krebs's cycle and is called the matrix. The other area, on the surface of the membranes, contains the enzymes of the electron transport system and is called the cristae. Be able to recognize the cristae and matrix in the diagram of the mitochondria below

Nucleus

- Function-acts to control the metabolic activities of the cell. Is the central control centre which monitors internal and external conditions and turns on or off different genetic programs.
- Structure-is surrounded by a membrane which is similar in structure to the plasma or cell membrane. Nuclear pores or holes occur at intervals along the membrane. These holes provide a way for the nucleus to communicate with the cytoplasm. Substances pass in and out of the nucleus through these openings.

Nucleolus

- Function-Rich in RNA and is the site of the synthesis of ribosomes
- Structure-consists of densely packed chromosomes, protein and precursor RNA strands from which the subunits of ribosomes are formed.

Vacuole

- Function-In plants it can act as a storage area for ions, metabolic products such as sugars and amino acids, and toxic compounds. Its main function however is to increase cell size and surface area so that the absorption of ions is enhanced.
- Structure-Fluid pressure builds up in the vacuole causing the cell to become elongated and extended increasing surface area and cell size. It is bounded by a cell membrane.

Chromosome

- Function-Carries the genetic code which determines characteristics of an organism.

- Structure-made up of genes which are in turn made up of DNA. The chemical components and the order of the chemical components determine the specific characteristics.

Cell Wall

- Function-allows plant cells to withstand high internal pressure without bursting.
- Structure-made of cellulose (provides the rigidity) cemented together with lignin.

Vesicles

- Function-Contain products that have been packaged/modified by the golgi (eg. Proteins like enzymes, plasma proteins, peptide hormones etc.) . It has the same structure as a vacuole only it is smaller in size.