

Unit - 3
Cell - Structure & Functions.
chapter - 8
Cell: The Unit of Life

Q.1 - Explain structure of mitochondria?

- The number of mitochondria per cell is variable depending on the physiological of the cells.
- It is sausage-shaped or cylindrical having a diameter of $0.2 - 1.0 \mu\text{m}$ & length $1.0 - 4.1 \mu\text{m}$.
- Each mitochondria is a double membrane bound-structure with the outer membrane & inner membrane dividing its lumen distinctly into two aqueous compartments.
- i.e. outer compartment & the inner compartment.
- The inner compartment is filled with a dense homogeneous substance called the matrix.
- The outer membrane forms the continuous limiting boundary of the organelle.
- The inner membrane forms a number of infoldings called the cristae towards the matrix.
- mitochondria are the sites of aerobic respiration.
- They produce cellular energy in the form of ATP hence they are called 'power house' of the cell.
- The matrix also possesses single circular DNA molecule, few RNA molecules, ribosomes & the component required for the synthesis of protein.

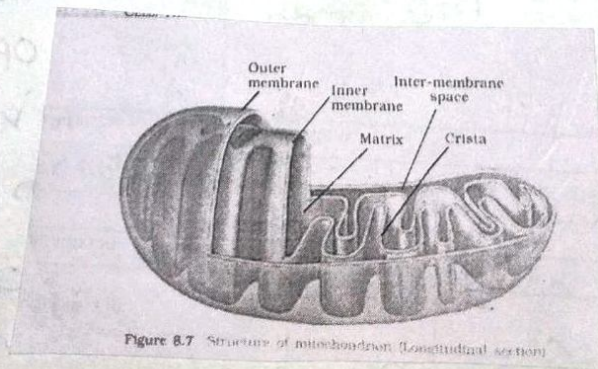
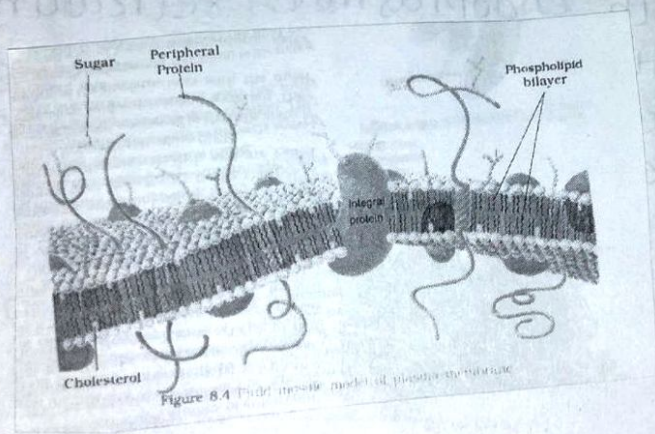


Figure 8.7 Structure of mitochondrion (Longitudinal section)

Q. No. 2 Explain the cell membrane with help of Diagram.

- cell membrane is mainly composed of lipids & proteins
- Lipids are arranged within the membrane with the polar head towards the outer sides & the hydrophobic tails towards the inner part.
- This ensures that the non-polar tail of saturated hydrocarbons is protected from the aqueous environment.
- In addition to phospholipids membrane also contains cholesterol.
- The ratio of protein & lipid varies considerably in different cell types.
- membrane proteins can be classified as integral & peripheral.
- peripheral proteins lie on the surface of membrane while the integral proteins are partially or totally buried in the membrane.
- Structure of cell membrane was proposed by Singer & Nicolson. widely accepted as fluid mosaic model.
- The fluid nature of the membrane is also important from the point of view of function. like cell growth, formation of intercellular junctions, secretion, endocytosis, cell division etc.
- one of the most important functions of plasma membrane is the transport of the molecules.
- The membrane is selectively permeable to some molecules present on either side of it.
- many molecules can move across the membrane without any requirement of energy this is called the passive transport.

- movement of water by diffusion is called osmosis.
- A few ions / molecules are transported across the membrane against their ~~trans-~~ concentration gradient i.e from lower to the higher concentration.
- Such a transport is an energy dependent process in which ATP is utilised & is called active transport.

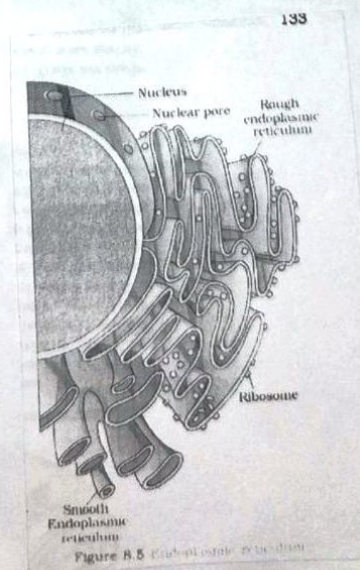


Q. No. 3. What is centromere? & Explain classification of chromosome & different types of chromosome. Some with the help of diagram.

Q. No. 3. Describe the cell organelle Endoplasmic Reticulum & Golgi Apparatus?

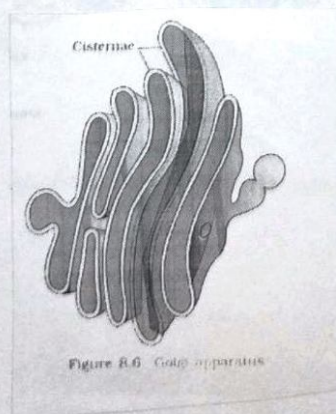
Endoplasmic Reticulum :-

- Reticulum of tiny tubular structures scattered in the cytoplasm that is called endoplasmic reticulum.
- E.R divides the intracellular space into two distinct compartments i.e. luminal & extra luminal compartment.
- E.R often shows ribosomes attached to their outer surface.
- The endoplasmic reticulum bearing ribosome on their surface is called rough endoplasmic reticulum (RER).
- In the absence of ribosome they appear smooth & are called smooth endoplasmic reticulum (SER).
- RER is frequently observed in the cells actively involved in protein synthesis & secretion.
- Smooth endoplasmic reticulum is the major site for synthesis of lipid. In animal cells lipid-like steroidal hormones are synthesised in SER.



Golgi Apparatus :-

- Golgi apparatus consist of many flat, disc-shaped sac or cisternae of 0.5 μm to 1.0 μm dia.
- These are stacked parallel to each other.
- varied no. of cisternae are present in golgi complex.
- The golgi cisternae are concentrically arranged near the nucleus with distinct convex cis or the forming face & concave trans or maturing face.
- The main function is packaging of materials to be delivered either to the intra-cellular target or secreted outside of the cell.
- materials to be packaged in the form of vesicles from the E.R fuse with the cis face of golgi apparatus & move towards the maturing face.
- This explain, why the golgi apparatus remain in close association with the E-R.
- Golgi apparatus is the important site of formation of glycoprotein & glycolipids.



Q.No.4 - Explain types of chromosomes base on the position of centromer.

- - centrosome is an organel usually containing two cylindrical structures, called centriole.
- Every chromosome essentially has a primary constriction or the centromer on the sides of which disc shaped structures called kinetochores are present
- Centromere holds two chromatids of a chromosome
- Based on the position of the centromere, the chromosomes can be classified into four types-
- The metacentric-chromosome has middle centromere, the centromere forming two equal arms of the chromosome.
- The sub-metacentric chromosome has centromere slightly away from the middle of the chromosome resulting into one shorter arm + one longer arm.
- In case of acrocentric chromosome the centromere is situated close to its end forming one extremely short & one very long arm, whereas the telocentric chromosome has a terminal centromere.

telocentric chromosome has a terminal centromere.

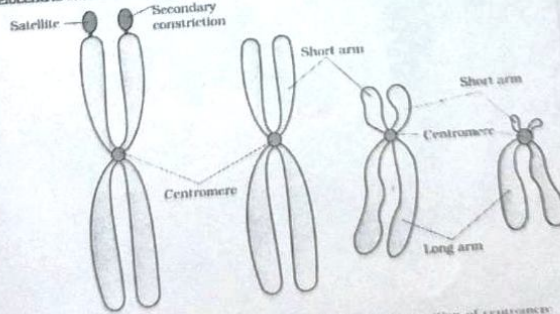


Figure 8.10 Types of chromosomes based on the position of centromere.