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B.Sc. Part-I (Zool 'Sub'),

Paper-I Gr-'B'

Dr. Pritam Kumar
Deptt of Zoology
Shershah College Sasaram
V.K.S. University Ara.

ENDOPLASMIC RETICULUM

Q:— Describe the structure and functions of endoplasmic reticulum?

Ans:

Endoplasmic reticulum is an important organallac of cells. it is first time reported by Dr. Fullman in 1945. But the name "endoplasmic reticul-um" is given by K.R. Porter in 1953. it is faund in the form of network of fine tubular structure inside the protoplasm. its one end is connected with nuclear membrane and other ends is connected with plasma membrane. its wall is made by single lipo-proteinaus membrane. The space of tubules is called lumen, Endoplasmic reticulum may be of two types:

(i) Rough Endoplasmic Reticulum (R.E.R):—

In these E.R. granular ribosome present at outer wall and it is necessary for protein synthesis.

(ii) Smooth Endoplasmic Reticulum (S.E.R):—

In these Endoplasmic reticulum, the outer wall is smooth, because any ribosome is absent in it. it can not take part in protein synthesis but help in lipid metabolism.

Structure of (E.R) Endoplasmic reticulum:

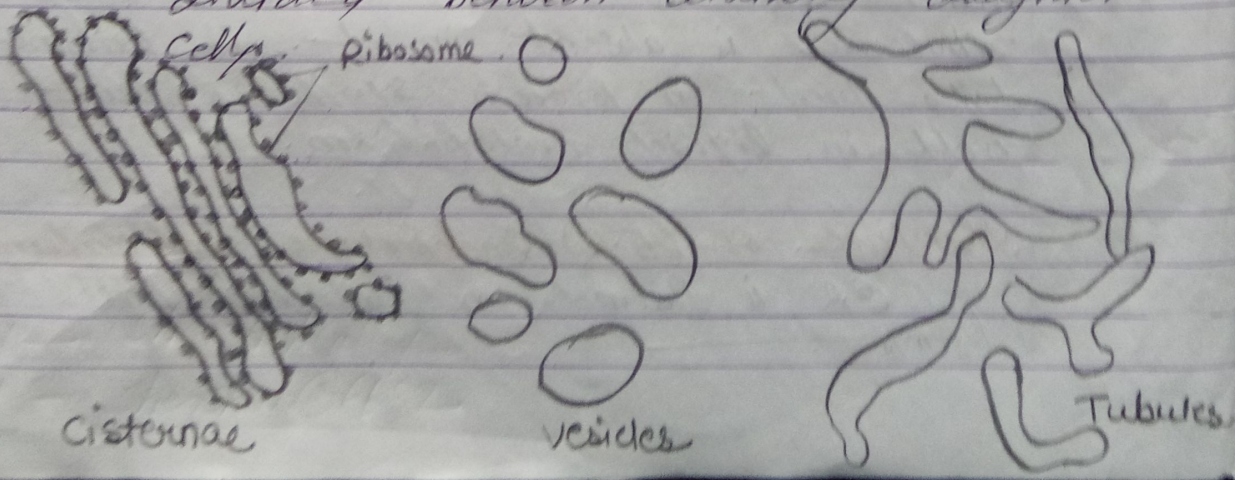
ER is faund in following three forms:—

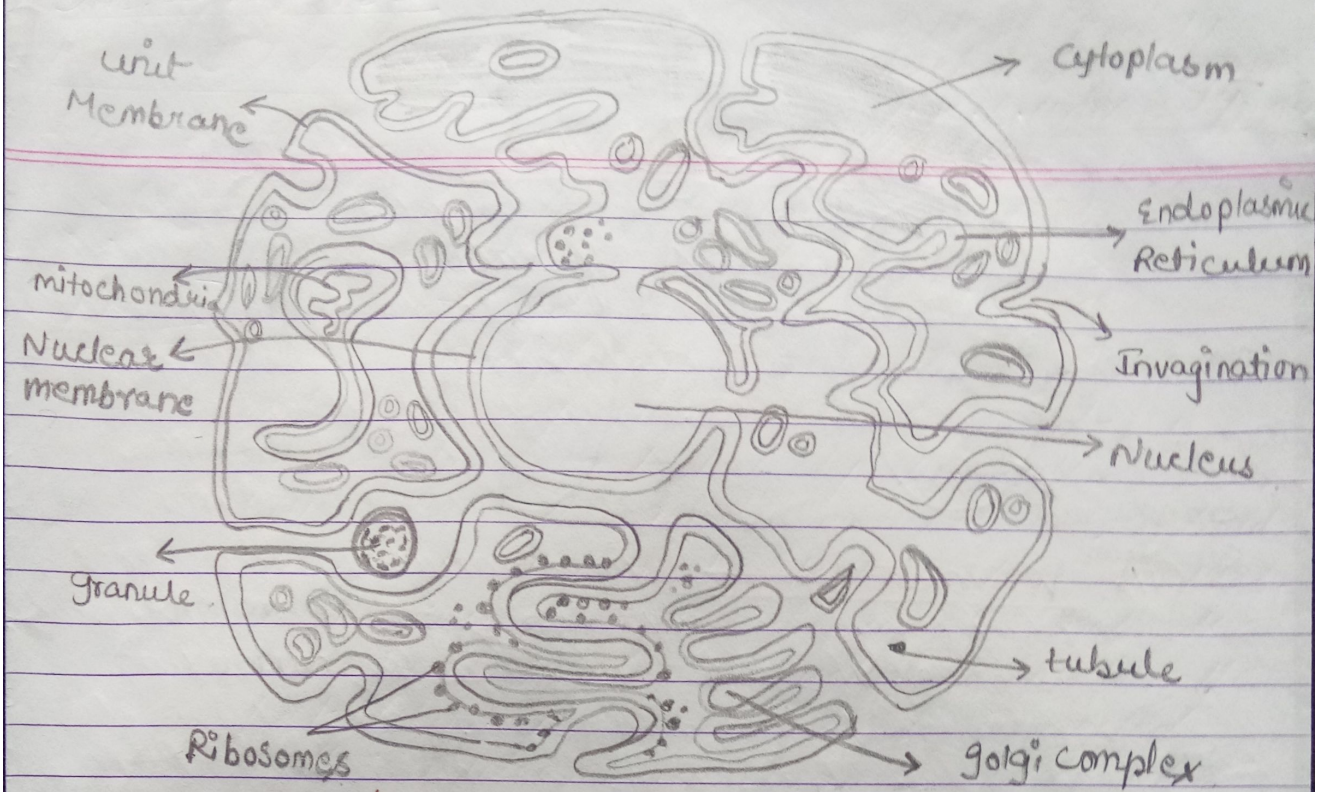
(I) Cisternae or lamellae: Parallely arranged bundles of elongated, flattened and unbranched tubular unit structure with a diameter of 30 to 40 millimicron are known as Cisternae or lamellae. These sites for rapid synthesis of protein.

(II) Vesicles: membranous structures which are always rounded or spherical or ovoidal with a diameter ranging from 25 to 500 millimicron are termed vesicles. These are more abundant in the pancreatic cells.

(III) Tubules: Small tubular branched membranous structures of various form having diameters of 50 to 100 millimicron and arranged irregularly in the cytoplasm are designated as Tubules.

Porter (1956) suggested the origin of ER from plasma membrane. ER has connections with other membranous structures of the cell such as mitochondria, plasma membrane and nuclear membrane. During mitosis ER breaks into pieces and these pieces are divided between dividing daughter cells.





Functions of E.R :

(i) it forms the endoskeleton of cells, hence it provides mechanical support to cell.

(ii) it is necessary for translocation of materials into different parts of cells.

(iii) Rough endoplasmic reticulum takes part in protein synthesis with the help of ribosome.

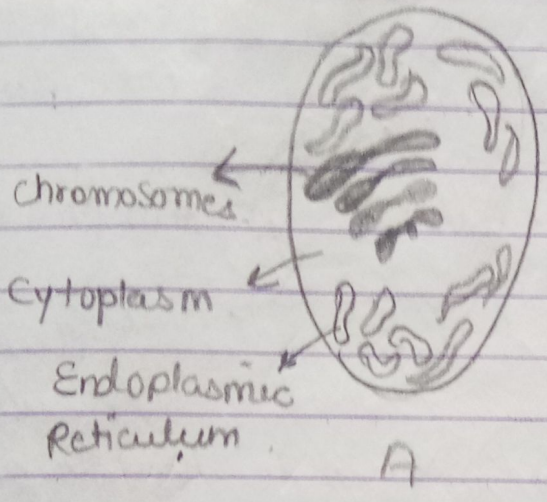
(iv) it is necessary for synthesis and storage of lipo-protein, glycogen etc.

(v) it also takes part in contraction and relaxation of skeletal muscles. Such type of E.R are called sarcoplasmic reticulum.

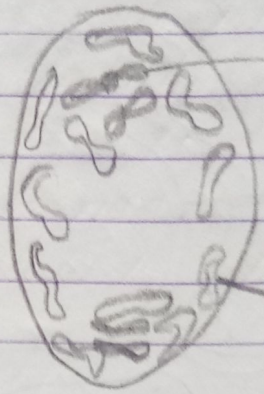
(vi) E.R serves as the site of synthesis of enzymes and ATP.

(vii) ER present in the pigmented epithelial cells of retina participates in the synthesis of vitamin-A.

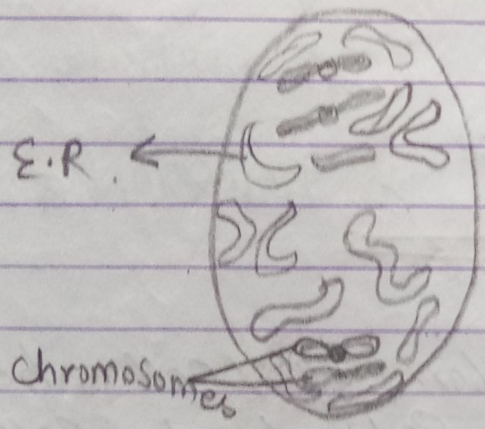
(viii) The ER membranous form the new nuclear membrane after each nuclear division.


Chromosomes
Cytoplasm
Endoplasmic
Reticulum

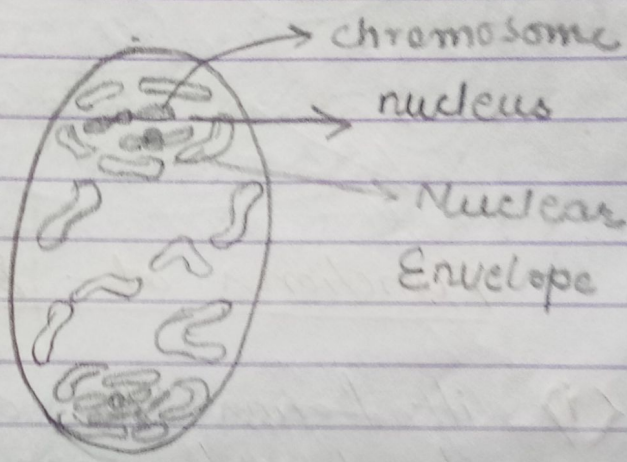
A


Chromosome
Endoplasmic
Reticulum

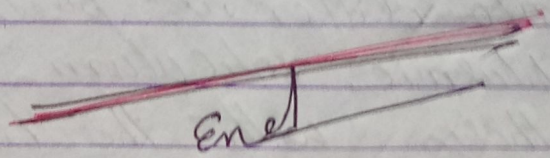
B


E.R
Chromosomes

C


Chromosome
nucleus
Nuclear
Envelope

D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