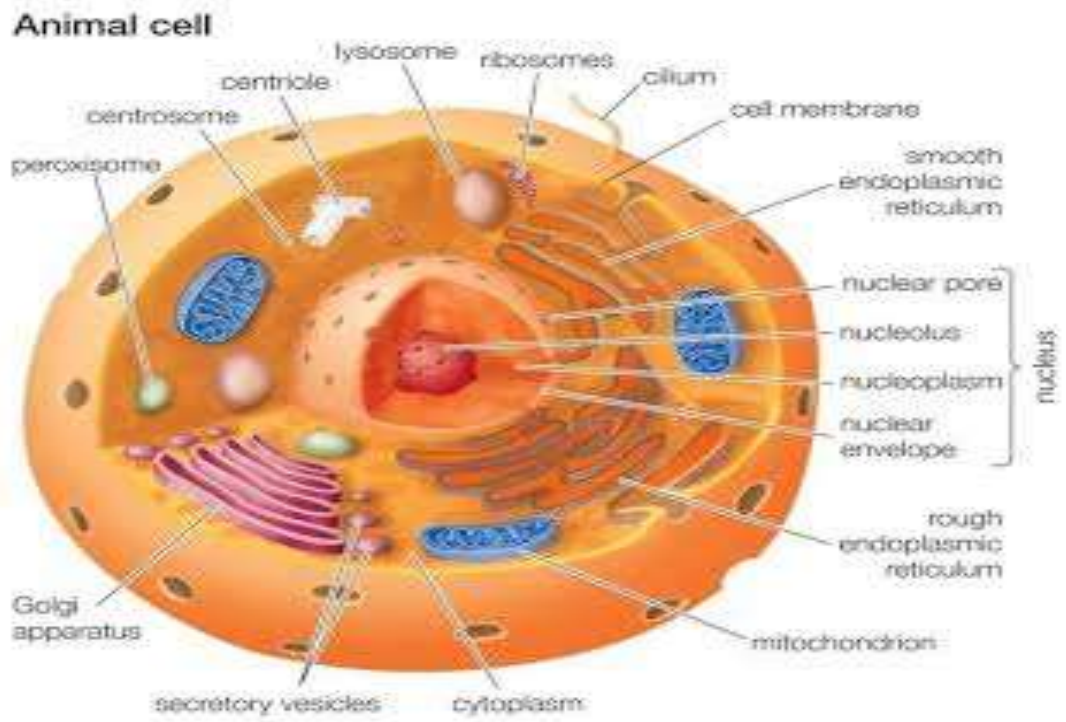
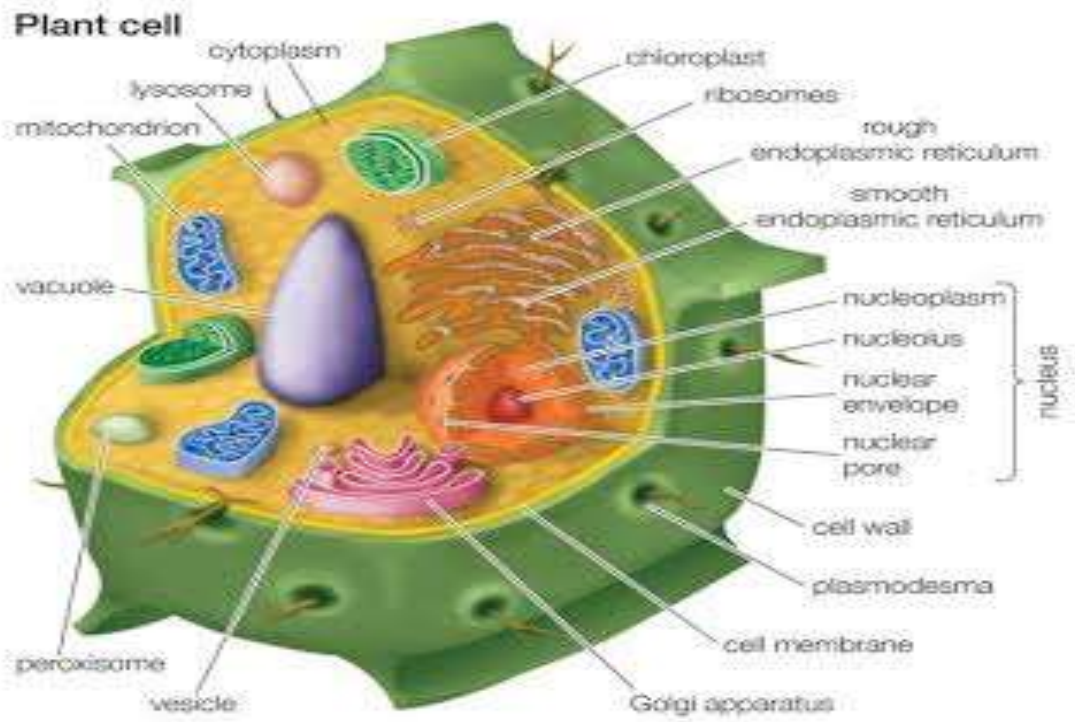
Eukaryotic Cell





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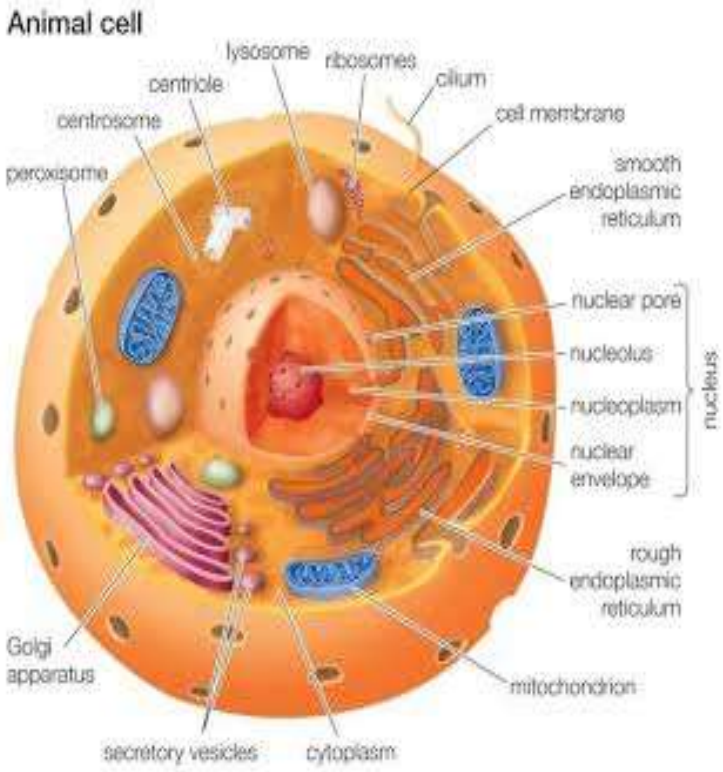
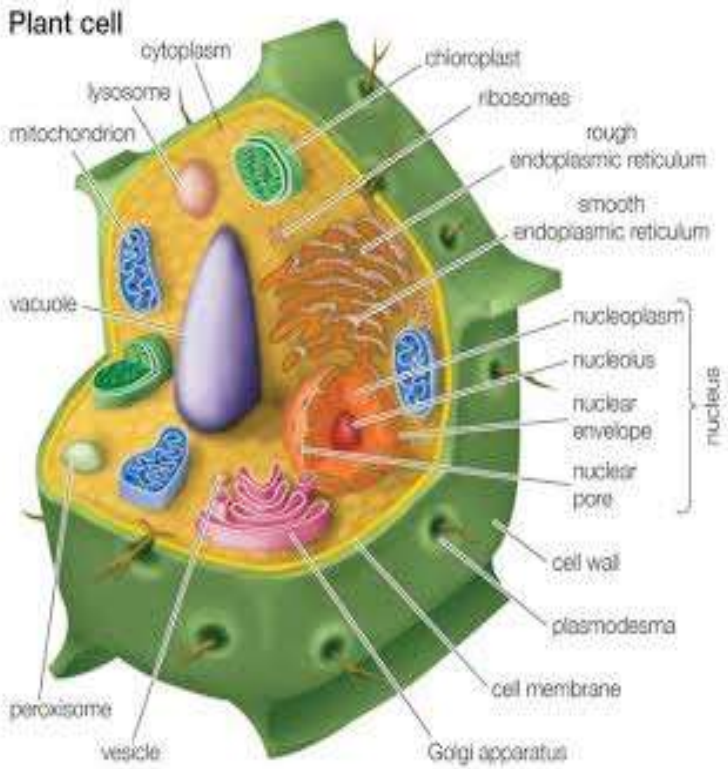
Introduction :

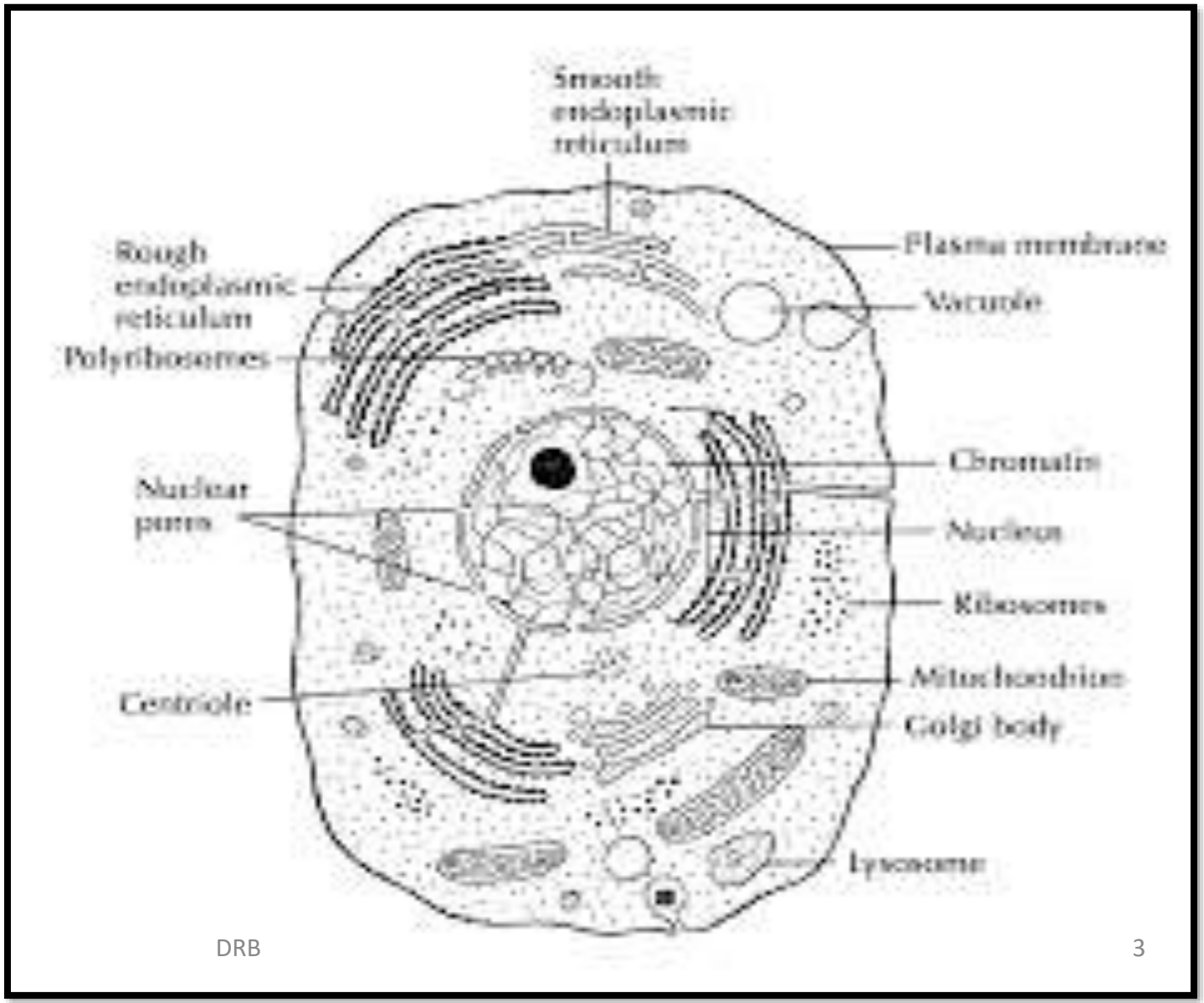
- Eu – True & Karyon - Nucleus
- cells with a distinct nucleus which possess organized chromosomes that store genetic material
- There are two types of eukaryotic cells
- 1) Animal Cell
- 2) Plant Cell





Structure and function of Eukaryotic Cell

ANIMAL CELL:



i) Plasma Membrane

- Cell surrounded by a plasma membrane
- It gives shape to the cell and protect cell from injury
- Double membrane of 75 A thickness
- Made up of lipoprotein and selectively permeable or semipermeable
- It gives an identity to the cell, protect cell organelles
- It helps in transport of ions and water
- It helps in digestion through phagocytosis and pinocytosis

ii) Cytoplasm :

- Cytosol consists of jelly like colloidal, ground substance called cytoplasmic matrix
- Differentiated into outer ectoplasm and inner endoplasm
- Matrix shows streaming movement called cyclosis
- It is composed of minerals, proteins, amino acids, sugars, nucleotide, tRNA, vitamins and enzymes
- Several types of organelles present in cytoplasm of a cell

iii) Mitochondria

- Mitos – thread and Chodros - granules
- Double membrane bound organelles
- Average number of mitochondria in a cell varies from 50 to 5000
- Under light microscope, it appears as rod – shaped
- Size varies from 0.2 to 2.0 micrometre in diameter
- They are the power houses of the cell
- They produce ATP molecules during cellular respiration and provide energy to cell for vital activities

iv) Endoplasmic Reticulum :

- Found in all eukaryotic cells except RBCs and ova
- Membrane bound organelle consisting of delicate branching
- Three types of elements forms ER
- Cisternae : stacks of flattened parallel sacs
- Tubules : irregular branching
- Vesicles : oval shape
- There are two types of ER – SER and RER

V) Golgi Complex or Golgi Apparatus :

- It is a cluster of smooth membranes associated with the ER
- It described first time by Camillo Golgi
- It consists of three distinct structures
- Cisternae : disc shaped and consist of central, flattened plate like compartments
- Tubules: forms peripheral network
- Vesicles : Small droplet like sacs which remain attached to tubules

vi) Lysosomes :

- Lyso – digestive and Soma – body
- Single membrane bounded bodies
- Round, elliptical or highily irregular in shape
- Consist of more than 50 hydrolytic enzymes
- They also called as suicide bags
- They show polymorphism
- They are capable of digesting all kinds of materials inside or outside the cell

vii)Ribosomes

- Granular organelles which do not have any enclosed membrane
- Composed of ribonucleoproteins
- They are attached to membrane of Endoplasmic Reticulum
- Spherical in shape and about 150 – 250 A
- 80S type of ribosomes present in eukaryotic cell
- They are the sites of protein synthesis
- They also called as protein factories

viii) Microbodies :

- They are roughly spherical in shape, bounded by single membrane
- They are usually 0.5 to 1 micrometre in diameter
- There are two types :
- Peroxisomes – they contain enzymes like oxidases and catalase

. Oxidation of amino acids and uric acid

- Glyoxysomes – contains enzymes for oxidation of fatty acids

ix) Cytoskeleton :

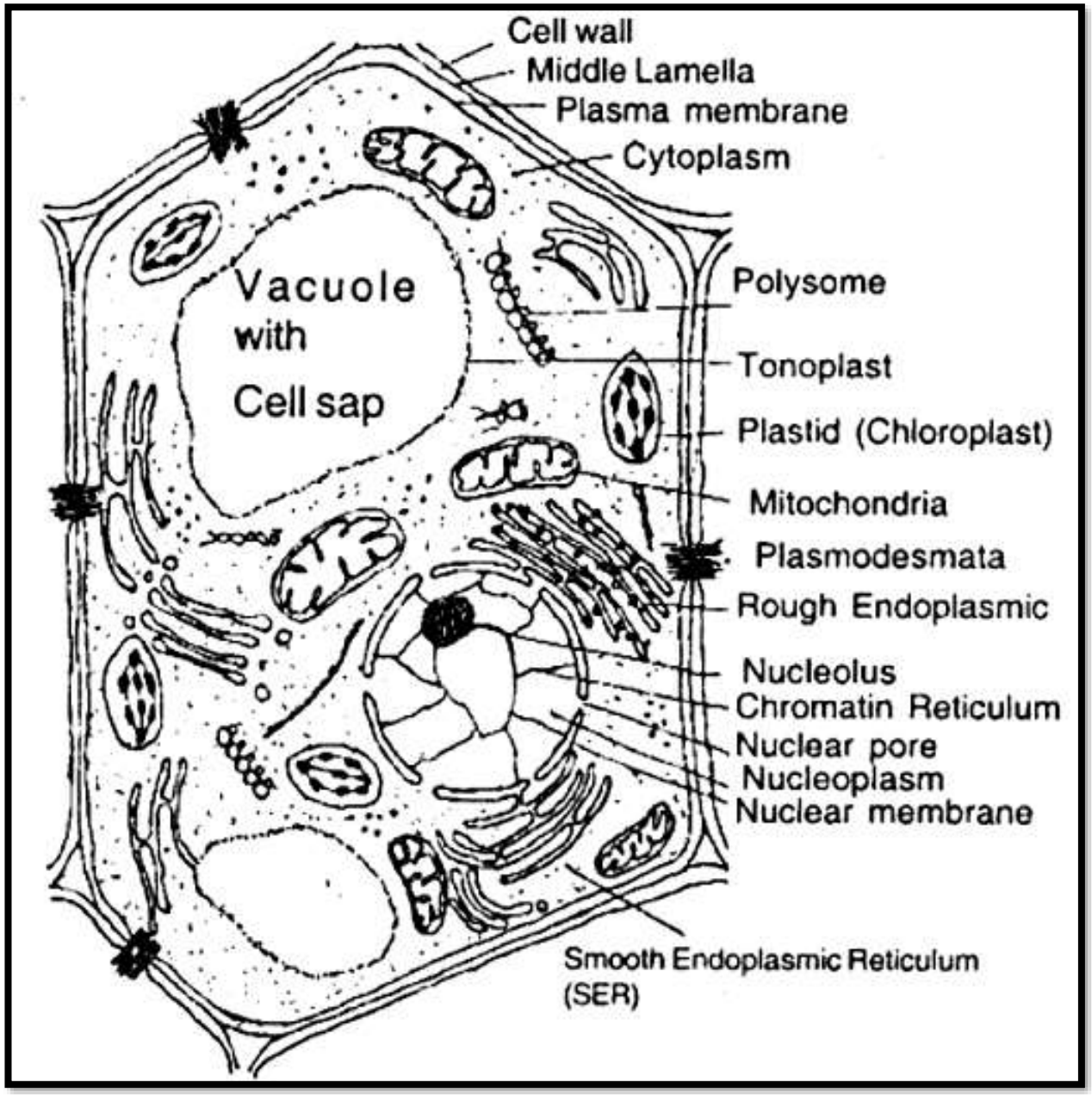
- Unique and form by long fibers
- It consists microtubules, microfilament and intermediate filament
- Microfilament – fine thread like protein fibers made from actin
- Microtubules – cylindrical tubes, 20 – 25 nm in diameter

  Composed of subunit of protein tubulin, alpha and beta
- Intermediate filament – about 10 nm in diameter, made from keratin

x) Nucleus :

- Controlling center of a cell
- It contains genetic material in the form of chromosomes
- It consists of Nuclear envolope, Nucleoplasm, nucleolus and Chromatin material
- Nuclear envolope – consists of Nuclear membrane, perinuclear space and nuclear pores

PLANT CELL :


Cell wall
Middle Lamella
Plasma membrane
Cytoplasm
Vacuole with Cell sap
Polysome
Tonoplast
Plastid (Chloroplast)
Mitochondria
Plasmodesmata
Rough Endoplasmic
Nucleolus
Chromatin Reticulum
Nuclear pore
Nucleoplasm
Nuclear membrane
Smooth Endoplasmic Reticulum (SER)

Cell Wall :

- Semi transparent covering outside the cell membrane
- It is strong, thick, rigid and measures 0.1 nm to several nm in thickness
- It made up of polysaccharides such as cellulose, pectin, lignin, hemicellulose & cutin
- It provides rigidity, support and shape to the cell
- It protects the plasma membrane against mechanical injury
- It also helps in the transport of materials.

Plastids :

- Double membrane organelle, semi autonomous having DNA
- There are three main types –
- Leucoplasts – colourless
- Chromoplasts – coloured containing pigments other than chlorophyll
- Choroplasts – green plastids containing chlorophyll

. Consist of colourless matrix stroma and many green colour grana

Vacuoles :

- Membrane bound, fluid filled spaces
- They are bounded by Single unit membrane called tonoplast
- Vacuoles are filled with fluid called cell sap
- Cell sap contains mineral salts, sugars, amino acids, proteins, esters, alkaloids, tannin
- They also contains waste products and water soluble pigments

Difference between plant cell and Animal cell

S. No	Plant cell	Animal Cell
1	Usually they are larger than animal cells	Usually smaller than plant cells
2	Cell wall present in addition to plasma membrane and consists of middle lamellae, primary and secondary walls	Cell wall absent
3	Plasmodesmata present	Plasmodesmata absent
4	Chloroplast present	Chloroplast absent
5	Vacuole large and permanent	Vacuole small and temporary
6	Tonoplast present around vacuole	Tonoplast absent
7	Centrioles absent except motile cells of lower plants	Centrioles present
8	Nucleus present along the periphery of the cell	Nucleus at the centre of the cell
9	Lysosomes are rare	Lysosomes present
10	Storage material is starch grains	Storage material is a glycogen granules