CHANDIGARH UNIVERSITY

Discover. Learn. Empower.

UNIVERSITY INSTITUTE OF SCIENCES

DIVISION ACEDEMIC UNIT 1

Bachelor of Engineering (Computer Science & Engineering)

Biology For Engineers 20SZT-148

CELL AND CELL STRUCTURE

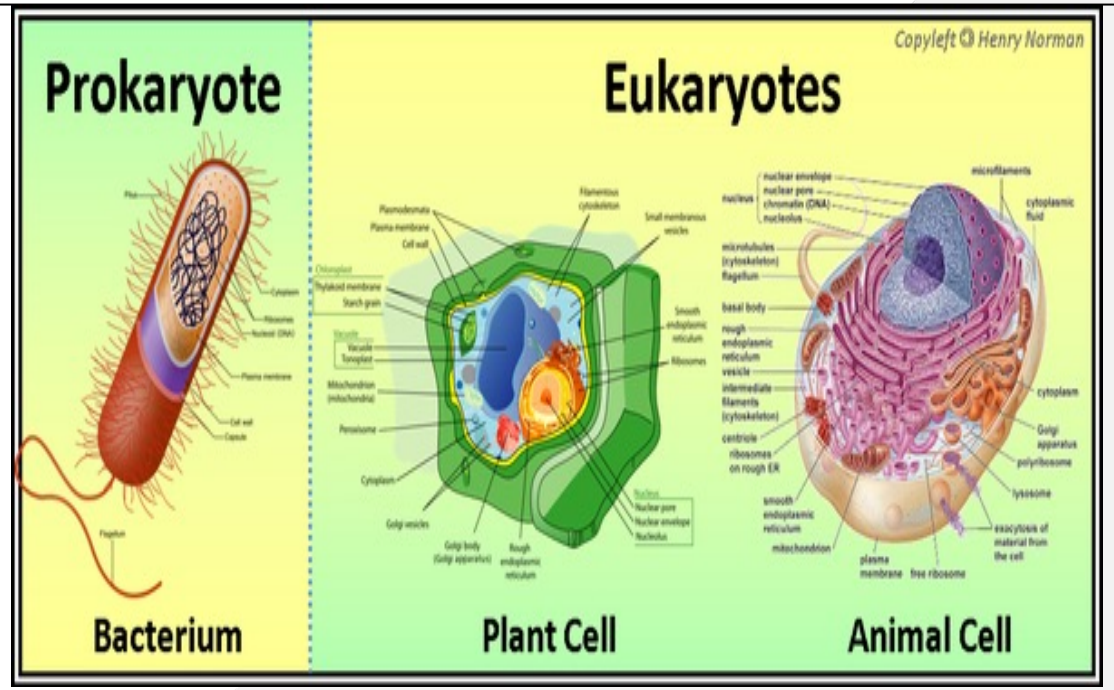
BY Shruti Sharma

DISCOVER . LEARN . EMPOWER

CELL AND CELL STRUCTURE

Course Objective

- This subject is designed to impart fundamental knowledge on basic and emerging fields of biology like bioinformatics.
- It is designed to impart knowledge that how to apply basics of biology in engineering.

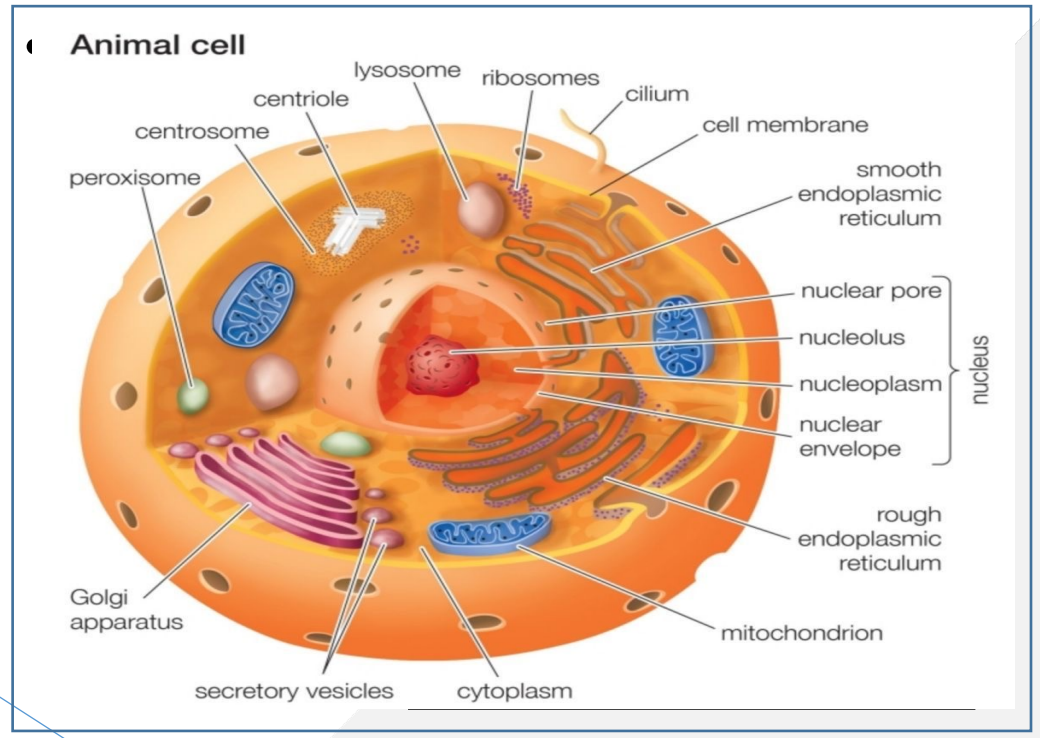


https://qph.fs.quoracdn.net/main-qimg-f432f88f1ad8692a045c9df16cadee74

CELL AND CELL STRUCTURE LECTURE3&4

Course Outcome

CO Number	Title	Level
CO1	To apply knowledge of cell biology to identify, formulate, and solve problems.	**Remember**
CO2	To excel in career as researcher in both traditional and emerging fields of science .	**Understand**
CO3	To apply knowledge of molecular biology, biosensors and immunology to excel in areas such as entrepreneurship, medicine, government, and education	Understand
CO4	To think critically and creatively, especially about the use knowledge about biology of cancer and new areas of biology to address local and global problems	Understand



Will be covered in this lecture

Fig 1. Animal cell
https://cdn.britannica.com/03/114903-050-502CFE8D/Cutaway-drawing-cell.jpg

CELL AND CELL STRUCTURE

Endomembrane System Set of membranes suspended in the cytoplasm within a eukaryotic cell, dividing the cell into functional and structural compartments, either being connected directly, or exchanging material through vesicle transport

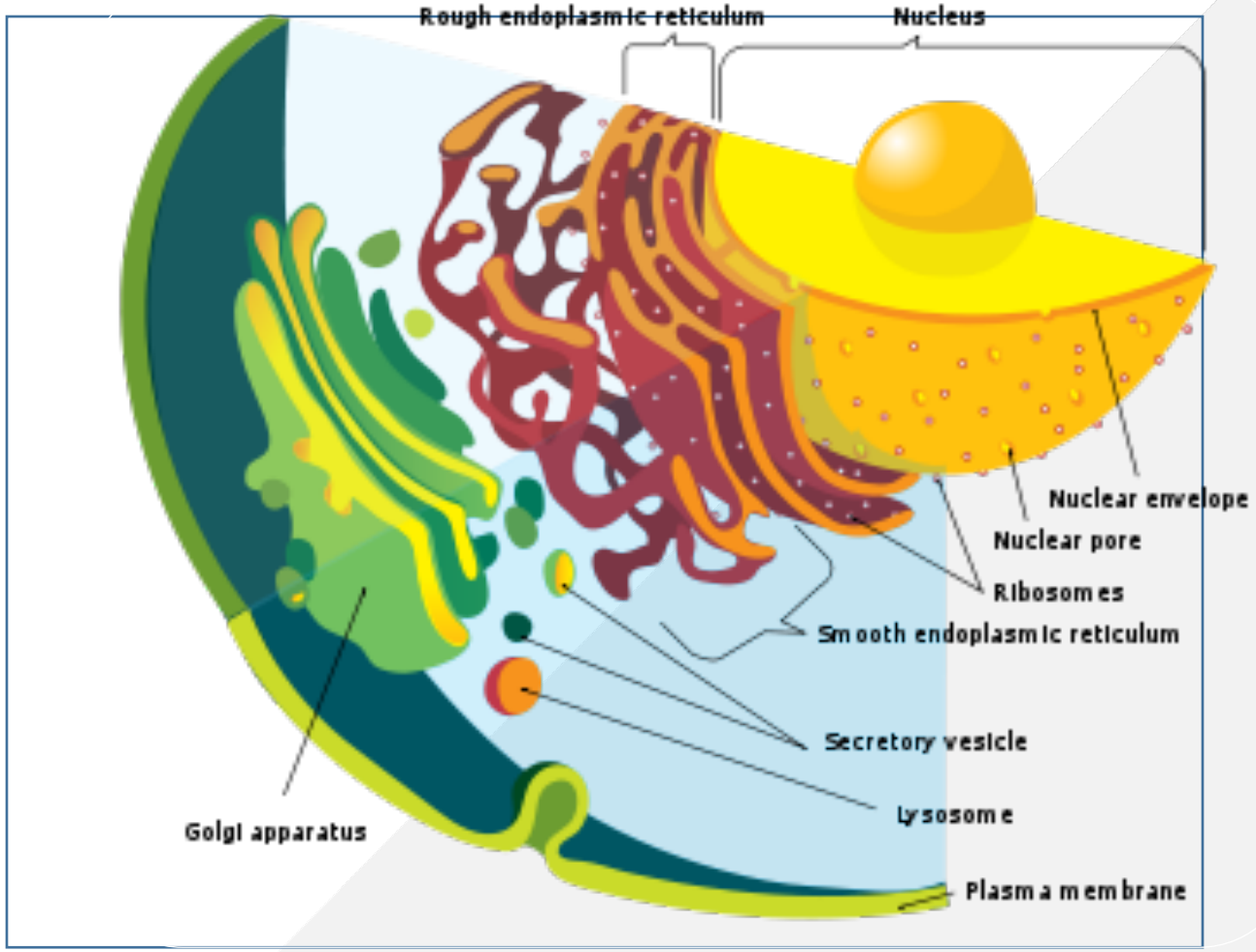


Fig 2. Endomembrane Systemhttps://upload.wikimedia.org/wikipedia/commons/thumb/4/44/Endomembrane_system_diagram_en_%28edit%29.svg/1200px-Endomembrane_system_diagram_en_%28edit%29.svg.png

SYLLABUS

Unit 1 Two Chapters: (15 hours)

- **Chapter No.1**
- **Basic Cell Biology** 9 Hours
  Contact Hours
- Introduction: Living Organisms, Cells and Cell theory, Cell Structure and Function, Genetic information, protein synthesis, and protein structure.
- **Chapter No. 2**
- **Cell cycle & Tissue Engineering** 6 hours
- Cell growth, Cell Division, and differentiation. Ageing, apoptosis, stem
- Cell Biology and Tissue engineering

LECTURE OBJECTIVES

- The **cell** is the basic structural, functional, and biological unit of all known organisms.
- To study cell organelles
- Cells are often called the "building blocks of life".
- The study of cells is called cell biology, cellular biology, or cytology.
- Cell functions

CELL

- The **cell** is the basic structural, functional, and biological unit of all known organisms.
- A cell is the smallest unit of life.
- Cells are often called the "building blocks of life".
- The study of cells is called cell biology, cellular biology, or cytology.

CELL MEMBRANE

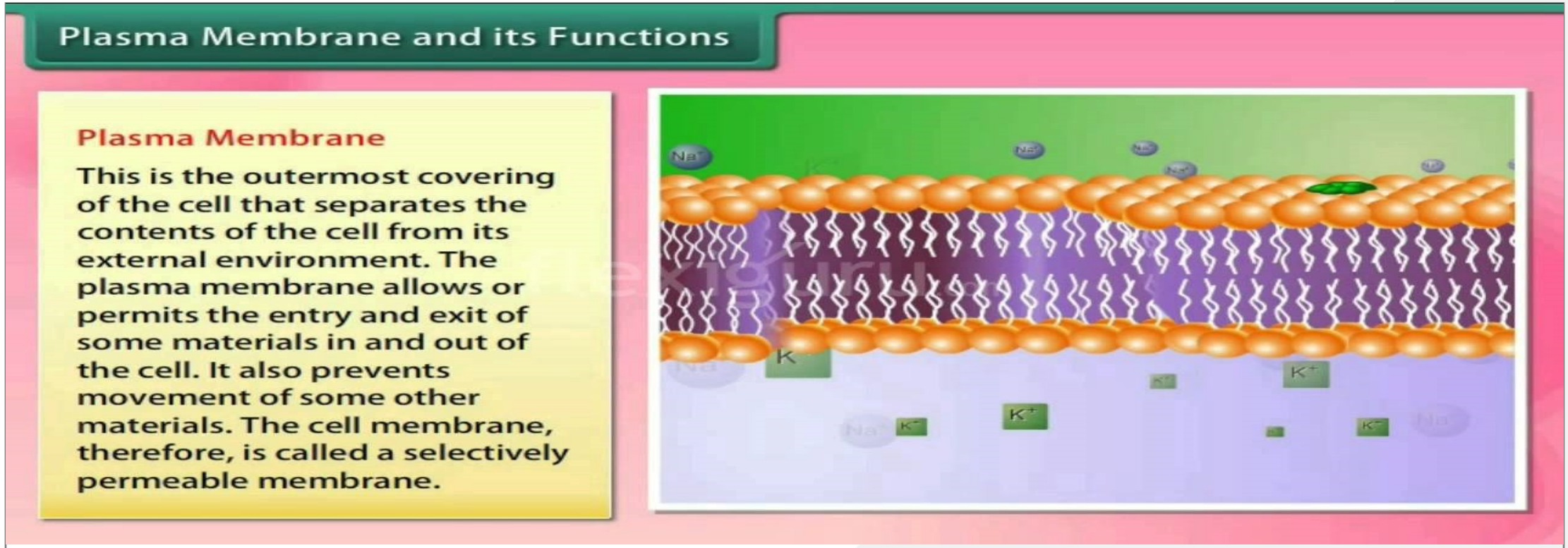


Fig 3.Cell Membrane:
https://i.ytimg.com/vi/f4dZF4n4Tt0/maxresdefault.jpg

CELL STRUCTURES

A cell consists of three parts:

- Cell membrane
- Nucleus,
- Cytoplasm.
- Within the cytoplasm lie of miniscule but distinct structures called organelles.

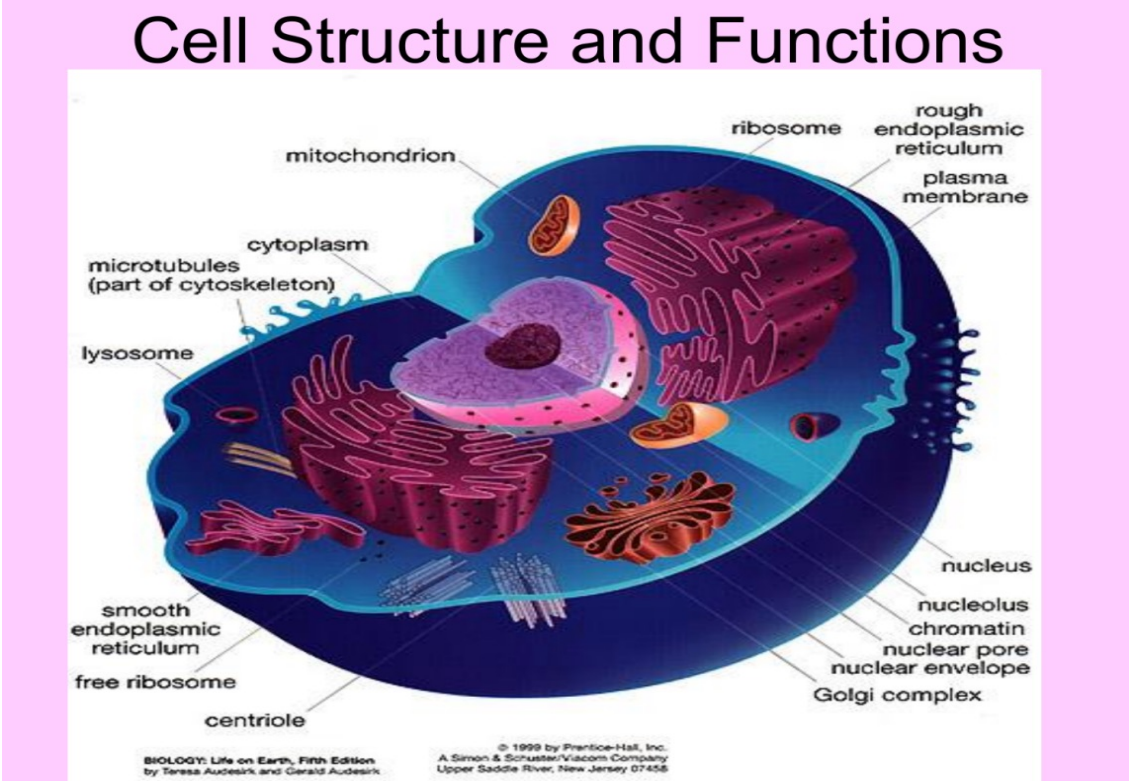


Fig 4.Cell structure: https://cdn.britannica.com/03/114903-050-502CFE8D/Cutaway-drawing-cell.jpg

CELL WALL

- It is made up of cellulose, hemicellulose and pectin.
- The cell wall is present exclusively in plant cells..
- It is a rigid and stiff structure surrounding the cell membrane.
- It provides shape and support to the cells and protects them from mechanical shocks and injuries.

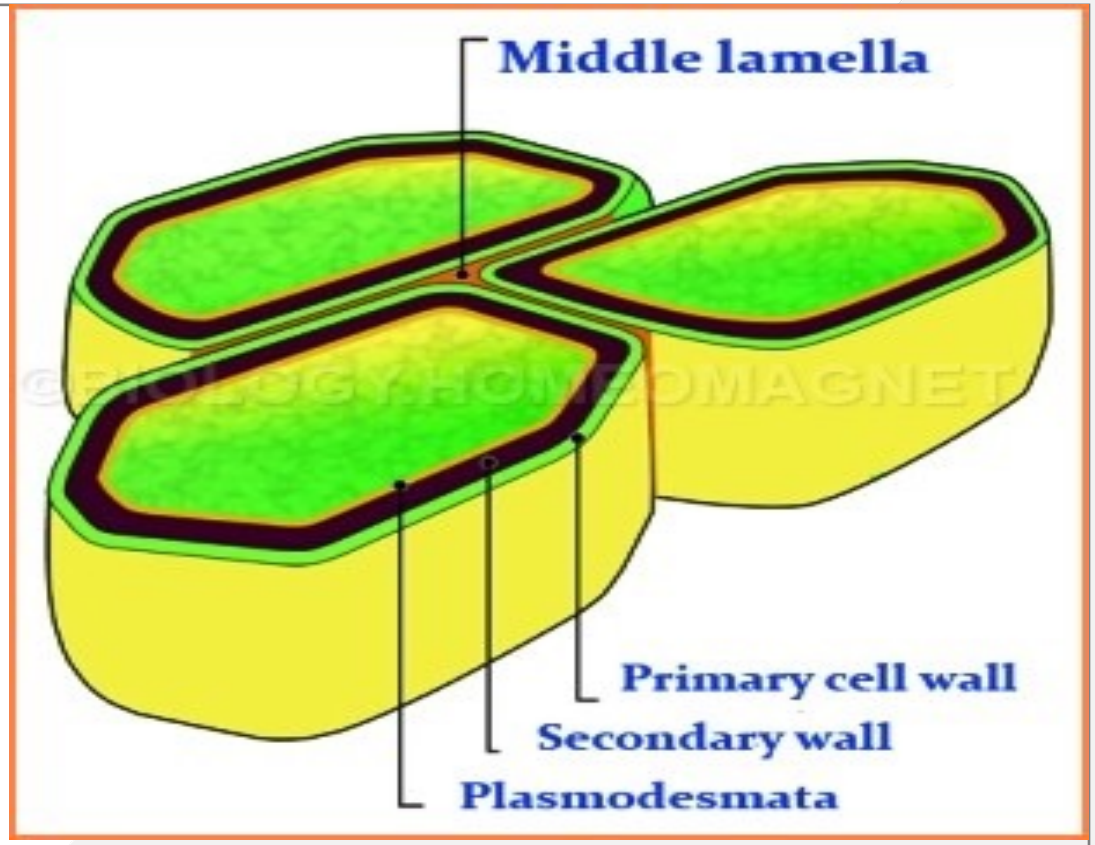


Fig No.5Cell Wall: http://biology.homeomagnet.com/wp-content/uploads/2018/04/plant-cell-wall-copy.jpg

CYTOPLASM

- The cytoplasm is a thick, clear, jelly-like substance present inside the cell membrane.
- Most of the chemical reactions within a cell take place in this cytoplasm.
- The cell organelles such as endoplasmic reticulum, vacuoles, mitochondria, ribosomes, are suspended in this cytoplasm.

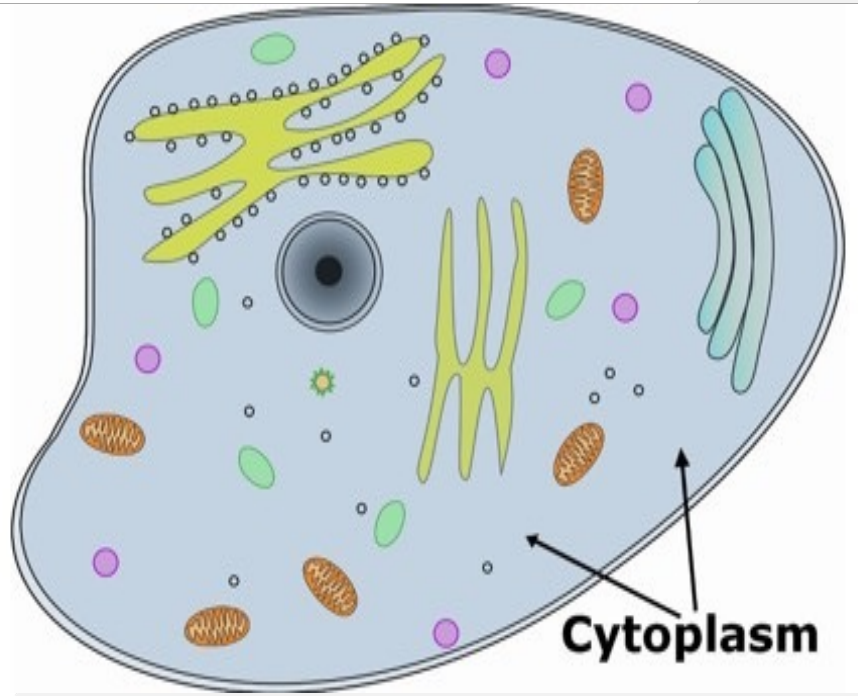


Fig No. 6 Cytoplasm: https://www.assignmentpoint.com/wp-content/uploads/2019/12/Cytoplasm.jpg

CEL ORGANELLES

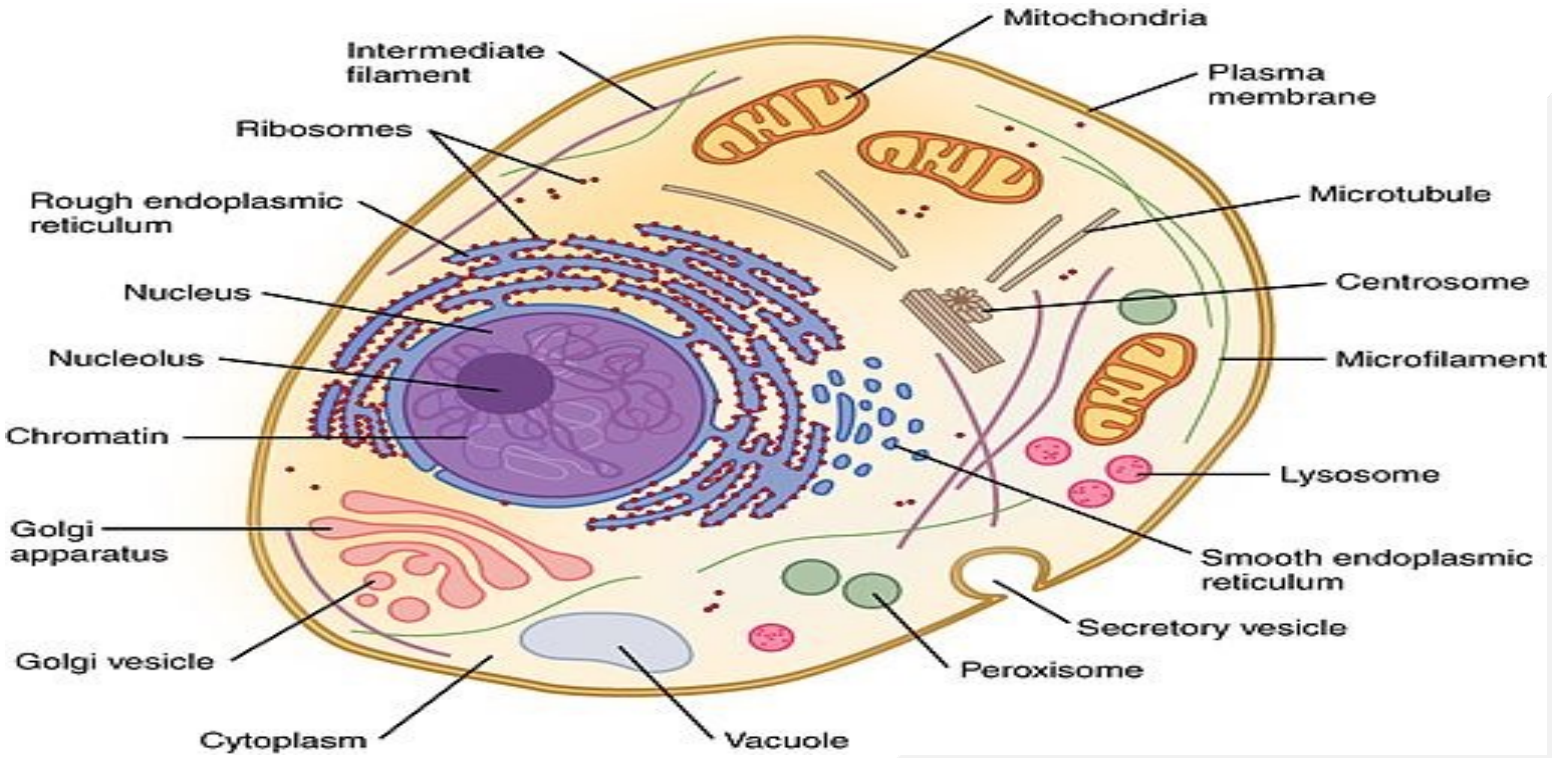


Fig No.7 Cell Organelles

https://www.microscopemaster.com/images/largerimageAnimal_Cell_and_Components.jpg

Questions for Polling

Q1.Difference between a plant cell and animal cell

1. Cell wall is present in Plant cell
2. Chloroplast is present in animal cell
3. True Nucleus is present in only Animal cell.
4. None of the above

NUCLEUS

- The nucleus contains the hereditary material of the cell, the DNA.
- It sends signals to the cells to grow, mature, divide and die.
- The nucleus is surrounded by the nuclear envelope
- The nucleus protects the DNA and is an integral component of a plant's cell structure.

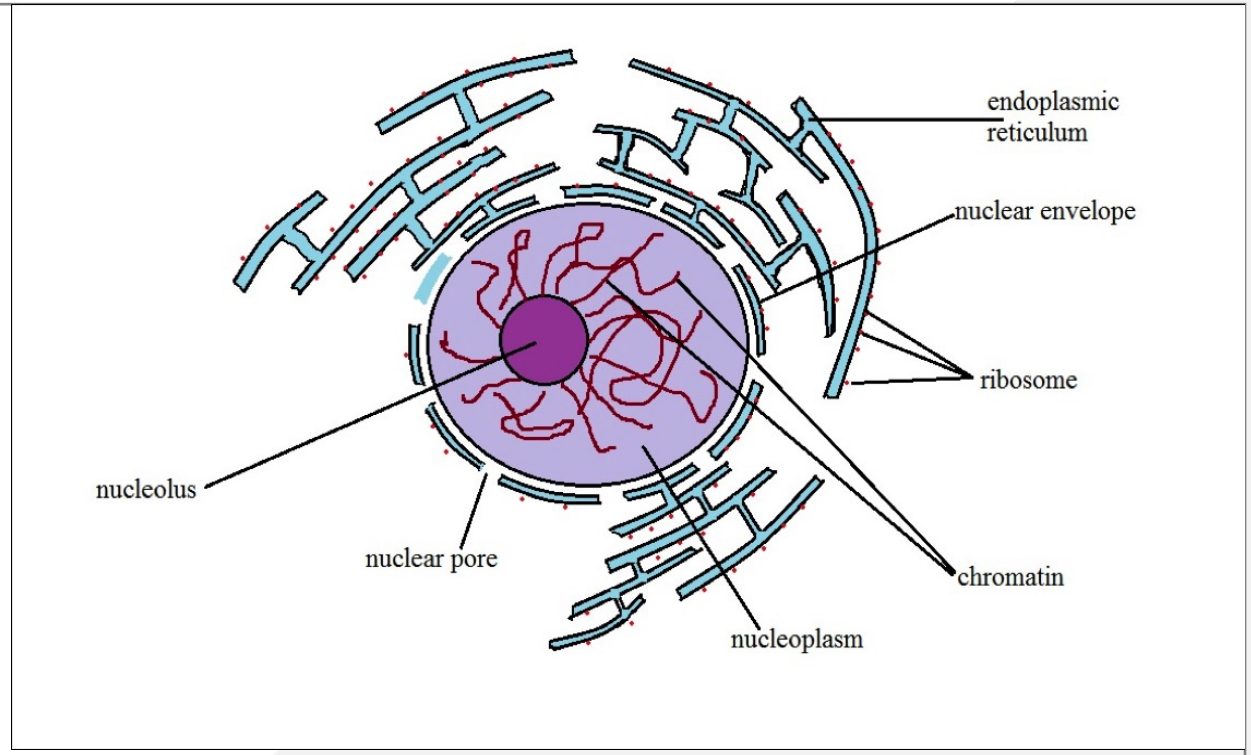


Fig 8. Nucleus
https://www.microscopemaster.com/images/nucleusdiagram.png

Mitochondria

- Mitochondria are mighty, microscopic, energy-producing structures .
- These organelles (specialized structures within a cell performing specific functions) live within almost every cell in our bodies.

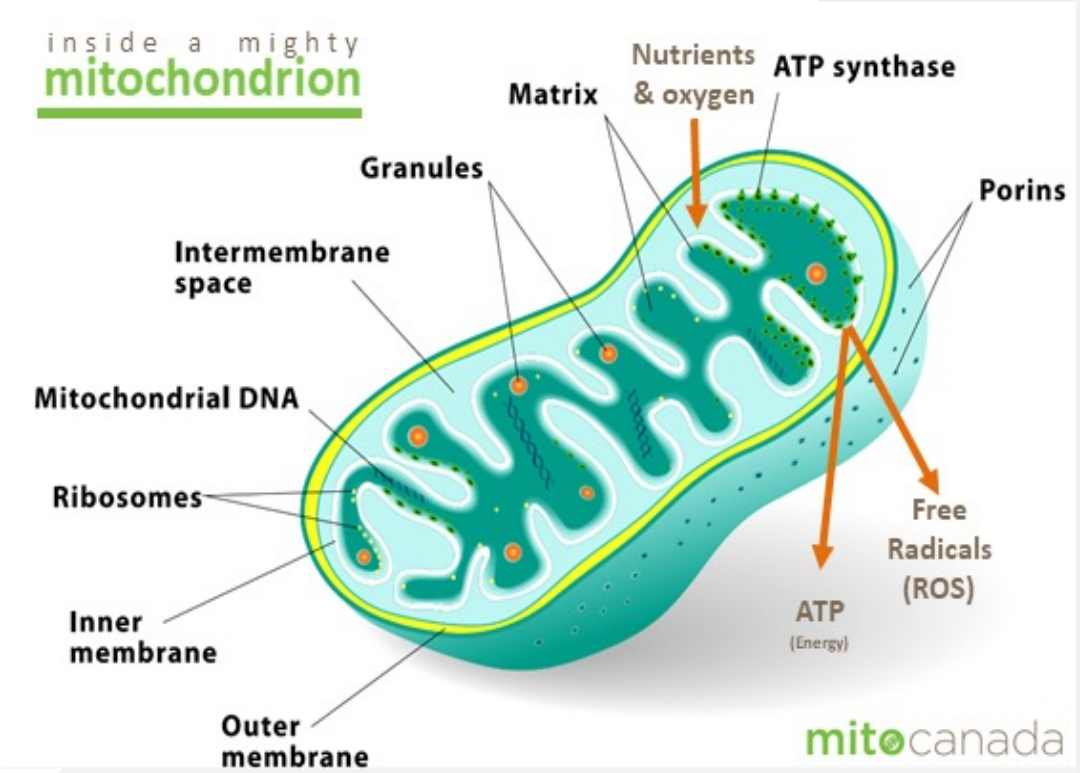


Fig 9. Mitochondria: https://cdn4.vectorstock.com/i/1000x1000/41/93/mitochondrion-vector-1314193.jpg

ENDOPLASMIC RETICULUM

The endoplasmic reticulum (ER) is an organelle made up of two subunits –

- Rough endoplasmic reticulum (RER),
- Smooth endoplasmic reticulum (SER).

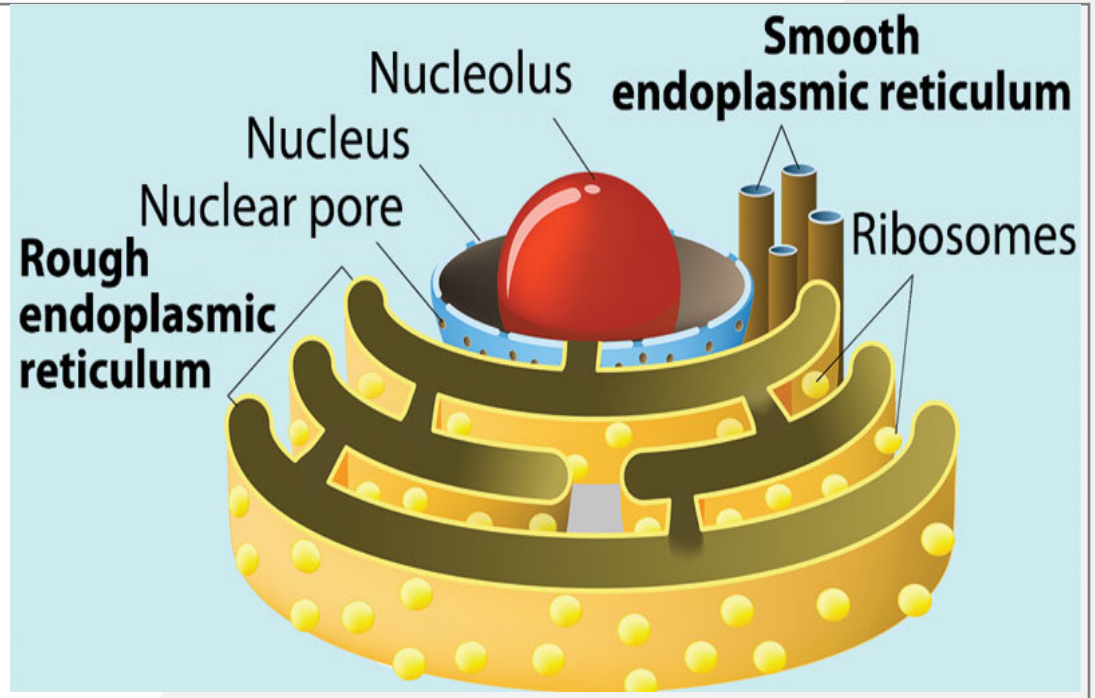


Fig 10.Endoplasmic Reticulum: https://163602-560839-raikfcquaxqncofqfm.stackpathdns.com/wp-content/uploads/2019/01/Endoplasmic-Reticulum-ER-Structure-Types-Functions.jpg

CHLOROPLAST

- The most important function of the chloroplast is to synthesize food by the process of photosynthesis.
- Absorbs light energy and converts it into chemical energy.
- Chloroplast has a structure called chlorophyll which functions by trapping the solar energy.

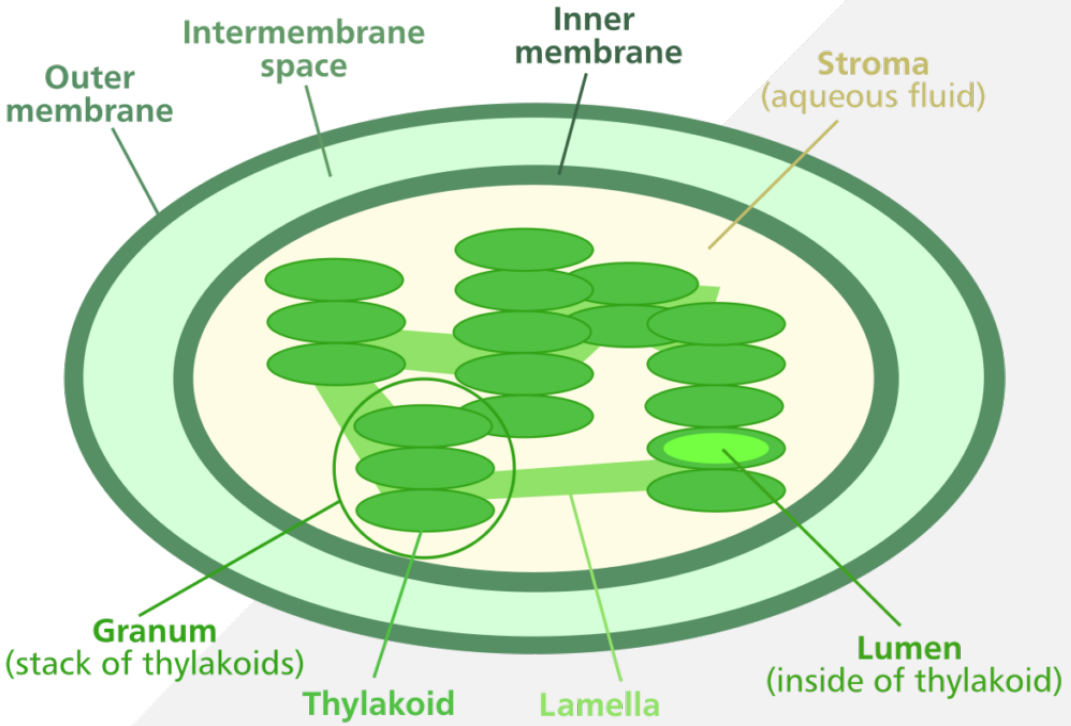


Fig 11.Chloroplast: https://d1whtlypfis84e.cloudfront.net/guides/wp-content/uploads/2019/10/09071738/1200px-Chloroplast_diagram.svg_-1024x724.png

Questions for Polling

Chloroplast is present in case of

1. Plant cell
2. Animal Cell
3. Both a & b
4. None of the above

FUNCTIONS OF A CELL

- Provide Structure and Support
- Facilitate Growth Through Mitosis
- Allow Passive and Active Transport
- Produce Energy
- Create Metabolic Reactions
- Aids in Reproduction

CONCLUSION

- Cell
- Cell Structures
- Cell Membrane
- Cell Wall
- Cytoplasm
- Cell Organelles: Nucleus, Mitochondria, Endoplasmic Reticulum
- Chloroplast

HOME WORK

- What are the functions of the cell?
- Which cellular structure regulates the entry and exit of molecules to and from the cell?

1. Cell Membrane
2. Cell Wall
3. Nucleus
4. Mitochondria

APPLICATIONS

The study of Cell and its structures will pave way for advance studies in the cell.

It will give thorough knowledge of the Cell to enable students to disseminate knowledge in pursuing excellence in academic areas.

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THANK YOU

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