



# THE CSS POINT

Yes We Can Do It!

Cell

“The Basic Unit of All Living Organisms”

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# What is Cell?

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- ▶ Cell is the basic, fundamental and structural unit of life.
- ▶ All living organisms are made up of cells.
- ▶ Often called the building block of life.
- ▶ Cell was first discovered by Robert Hooke in 1665
- ▶ The word *cell* comes from the Latin *cella*, meaning "small room". The descriptive term for the smallest living biological structure was coined by Robert Hooke in a book he published in 1665 when he compared the cork cells he saw through his microscope to the small rooms monks lived in

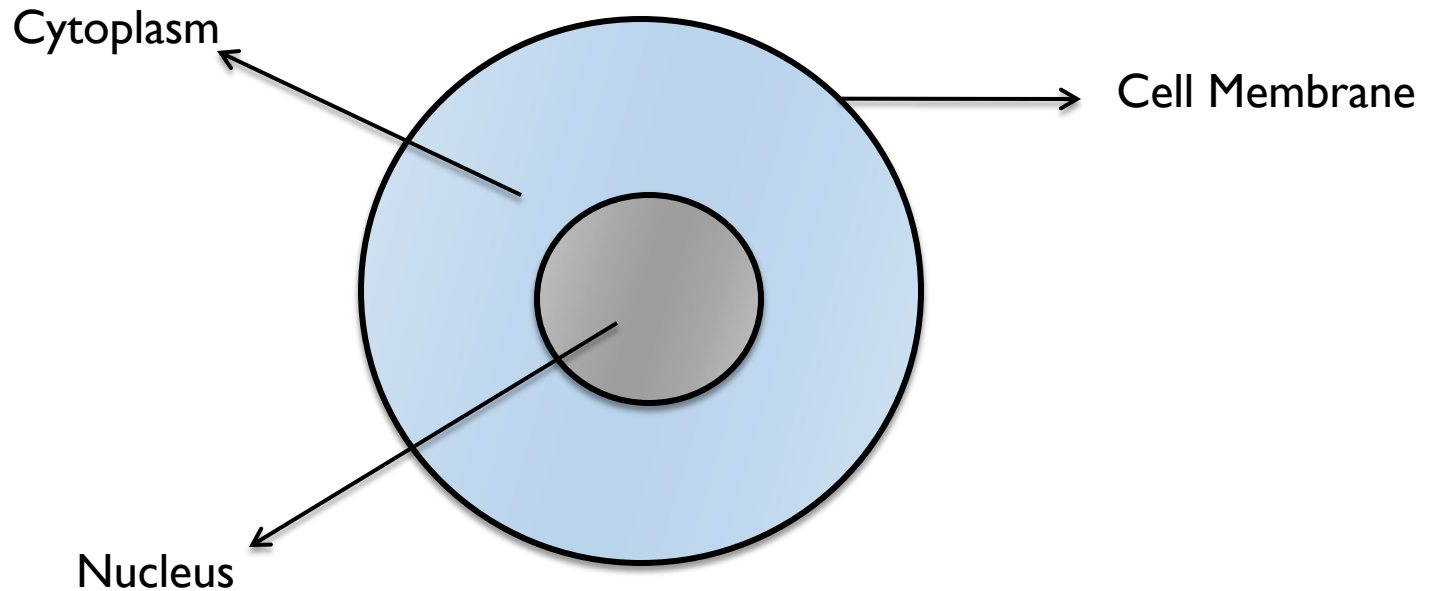
# Cell Theory

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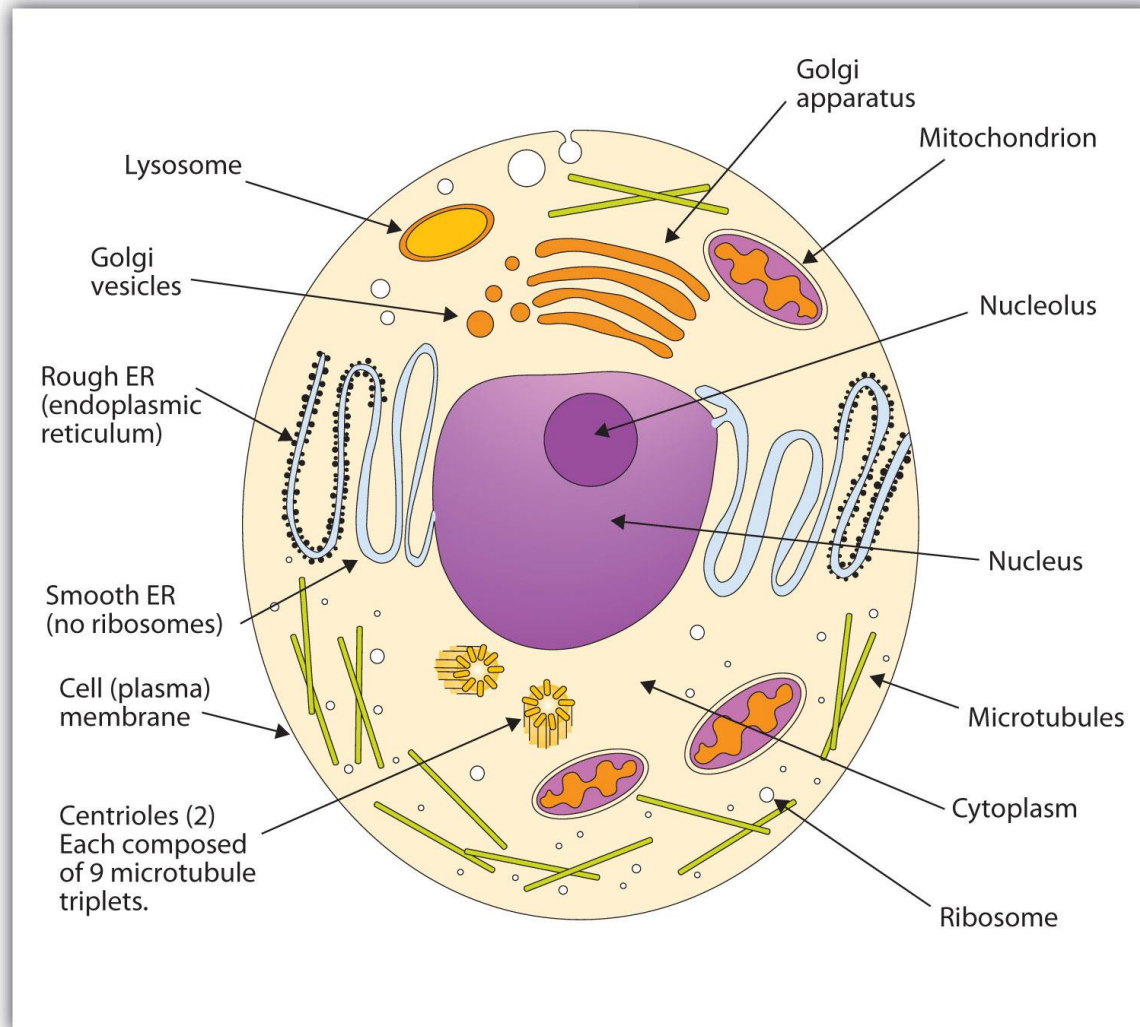
- ▶ Cell Theory was presented by Schleiden, Schwann & Virchow.
  
- ▶ **Cell Theory States that**
  1. Cells are basic, fundamental and structural unit of life
  2. All Cells come from Pre-existing Cells.
  3. Cells contain heredity material which transfer from one generation to another generation

# Basic Structure of Cell

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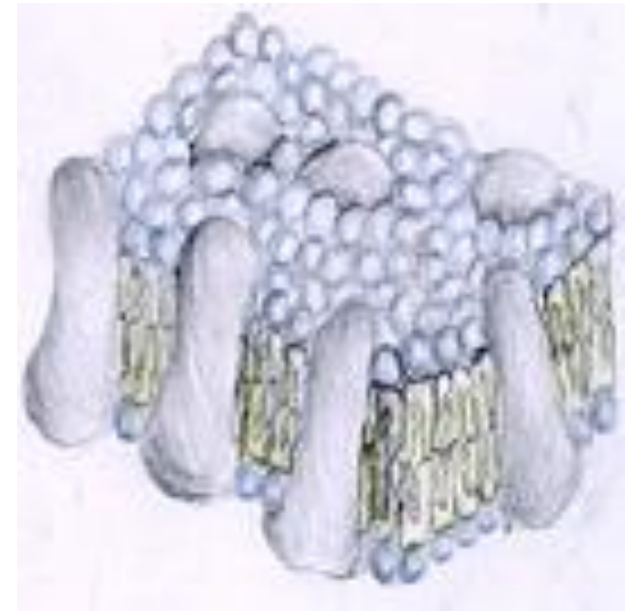
# Structure of Animal Cell



# Cell Membrane

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- ▶ Cell Membrane is outer layer of Animal Cell.
- ▶ It protects the cell.
- ▶ It is made mostly from a double layer of proteins and lipids (Lipo-Protein)
- ▶ It is Semi permeable in nature.
- ▶ It controls movement in and out of the cell



# Cytoplasm

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- ▶ Inside the cell there is a large fluid-filled space called the **cytoplasm**, sometimes called the **cytosol**.
- ▶ Cytoplasm is Jelly Like Substance.
- ▶ Almost All Important organelles of Cell are present in Cytoplasm.
- ▶ These Organelles from Cytoplasm carries all major activities of cell.

# Mitochondria

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- ▶ These are also called Chondriosomes.
- ▶ These are tubular or cup shaped structure.
- ▶ It is called Power House of Cell.
- ▶ Produces energy (ATP) through chemical reactions – breaking down fats & carbohydrates
- ▶ Controls level of water and other materials in cell
- ▶ Recycles and decomposes proteins, fats, and carbohydrates.
- ▶ 4000 Mitochondria are present in heart Cell
- ▶ 30 to 40 in normal cell.



# Endoplasmic Reticulum

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- ▶ ER frequently present in Cytoplasm
- ▶ This is a System of folded membrane.
- ▶ ER helps in transportation of materials in cell.
- ▶ ER has two parts
  1. Rough ER: It Contains Ribosomes on Surface. It helps in Protein Synthesis
  2. Smooth ER: It does not contain Ribosomes and helps in Synthesis of Lipids.



# Ribosomes

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- ▶ Tiny Organelles made-up of Protein and RNA
- ▶ Each cell contains thousands.
- ▶ Make proteins hence know as protein factory.
- ▶ Found on Endoplasmic Reticulum & floating throughout the cell.

# Lysosomes

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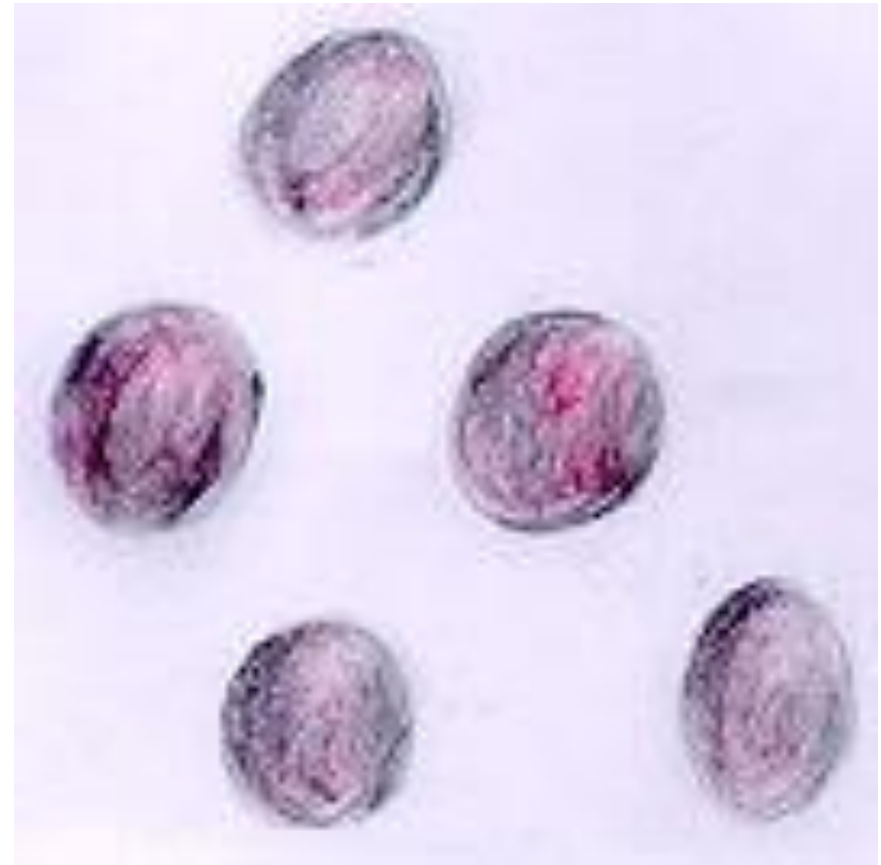


- ▶ These are spherical bodies surrounded by single membrane.
- ▶ Digestive 'plant' for proteins, fats, and carbohydrates
- ▶ Transports undigested material to cell membrane for removal
- ▶ Known as Suicide Sac
- ▶ Cell breaks down if lysosome explodes
- ▶ They only present in Animal Cell.

# Vacuoles

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- ▶ Membrane-bound sacs for storage, digestion, and waste removal
- ▶ Outer membrane called tonoplast
- ▶ Found in Both Animal and Plant Cell



## Centrioles

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- ▶ Centrioles are present in animal cell and absent in plant cell.
- ▶ Centrioles helps in cell division.

## Microtubules

- ▶ These are Straight, hollow cylindrical like structure found in Cytoplasm
- ▶ Their main function is structural support and Transportation.

# Golgi Bodies

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- ▶ They are also called “Dictosomes”
- ▶ Protein 'packaging plant'
- ▶ Main Function Transportation
- ▶ Move materials within the cell
- ▶ Move materials out of the cell



# Nucleus

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- ▶ It is round or spherical structure at the center of cell.
- ▶ It is bound by double membrane called Nuclear envelope or nuclear Membrane.
- ▶ Nucleus control all activities of cell and Called Brain of Cell.
- ▶ Jelly Like substance present inside nucleus called nucleoplasm.
- ▶ DNA and Chromosomes are present in Nucleus.
- ▶ Nucleolus is also present inside the nucleus.
- ▶ Nucleolus contain RNA.

# Chromosomes

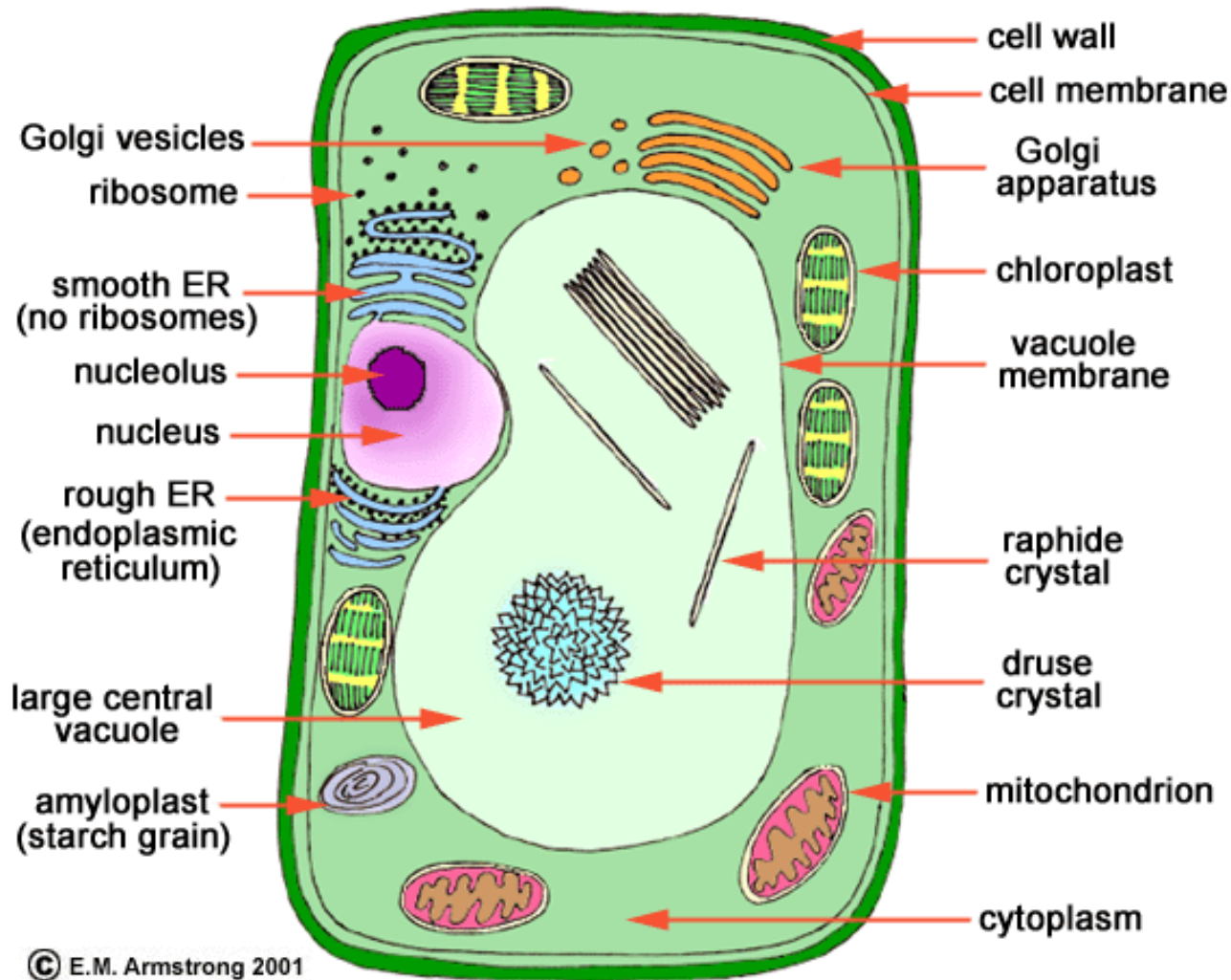
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- ▶ Chromosomes are thread like structure.
- ▶ Made-up of Protein and DNA
- ▶ Chromosomes are present in nucleus
- ▶ Contain instructions for traits & characteristics



# Structure of Plant Cell



# Cell Wall

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- ▶ It is Outer Membrane of Plant Cell.
- ▶ Cell wall is made-up of Cellulose.
- ▶ Cell Wall is non-living part of plant cell.
- ▶ Cell wall is secreted and maintained by Protoplasm.
- ▶ It maintains the cell shell.
- ▶ It provides rigidity to cell.
- ▶ It is permeable in nature.
- ▶ It helps in the absorption of water.

# Chloroplast

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- ▶ Usually found in plant cells
- ▶ Contains green chlorophyll
- ▶ Where photosynthesis takes place



# Plastids

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- ▶ Plastids are pigments found in plant cells to create various colors.
- ▶ A double membrane bound organelle involved in the synthesis and storage of food.
- ▶ It is commonly found within the cells of photosynthetic organisms, like plants.

# Difference Between Plant & Animal Cell

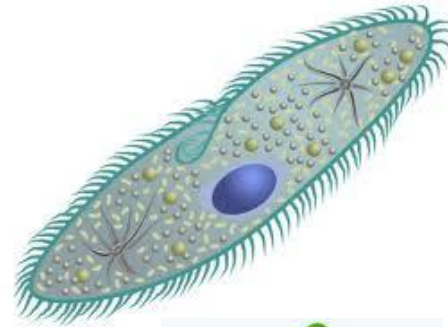
Plant Cell	Animal Cell
1. Outer membrane is called Cell Wall.	1. Outer membrane is called Cell Membrane.
2. Cell wall is made up of cellulose.	2. Cell Membrane is made up of lipids and proteins.
3. There is only one large Vacuole .	3. There are small numerous Vacuoles.
4. Chloroplast is present in plant cell.	4. Chloroplast is absent in animal cell.
5. Starch grains are present in Cytoplasm.	5. Starch grains are absent in animal cell.
6. Plastids are Present in Plant Cell	6. Plastids are Absent in Animal Cell
7. Centrioles are absent in Plant Cell	7. Centrioles are Present in Animal Cell
8. Plant Cells stored food in the form of starch	8. Animal cells stored food in the form of glycogen.

# Unicellular & Multicellular Organisms

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- ▶ Unicellular are those organisms which are made-up of a single cell.

For Example: Paramecium



Amoeba

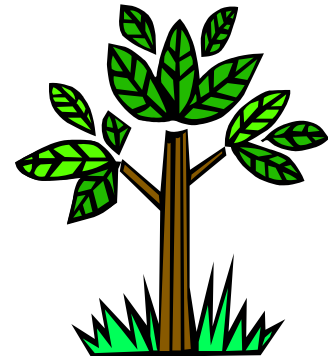
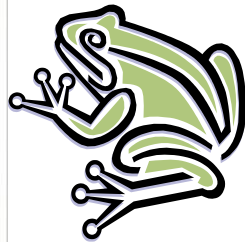


# Unicellular & Multicellular Organisms

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- ▶ Multicellular are those organisms which are made up of more than one cell.

For Example: Human, Frog, Fish, Parrot, Plants



# Types of Cells

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- ▶ There are two types of Cells

## **1. Prokaryotic Cell**

- > These are organisms or cells which lack a complete or distinct nucleus.
- > Prokaryotic cells do not have membrane bound organelles like mitochondria, nucleus, golgi bodies, lysosomes or endoplasmic reticulum.
- > Examples: Bacteria, Blue Green Alga etc...

## **2. Eukaryotic Cell**

- > Cells or organisms which have true nucleus bound by nuclear membrane.
- > They have Membrane bound organelles.
- > Examples: All living organisms other than Bacteria, Blue Green Alga and Virus.



# Past Papers

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- ▶ Structure of animal cell – 1994
- ▶ Cellulose – 1992
- ▶ Animal cell – 2008
- ▶ Similarities and differences between animals and plants – 2009
- ▶ Ribosomes – 2011
- ▶ Mitochondria – 2011
- ▶ Lysosomes – 2011
- ▶ Chloroplasts – 2011
- ▶ Golgi apparatus - 2011

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# Questions ?