

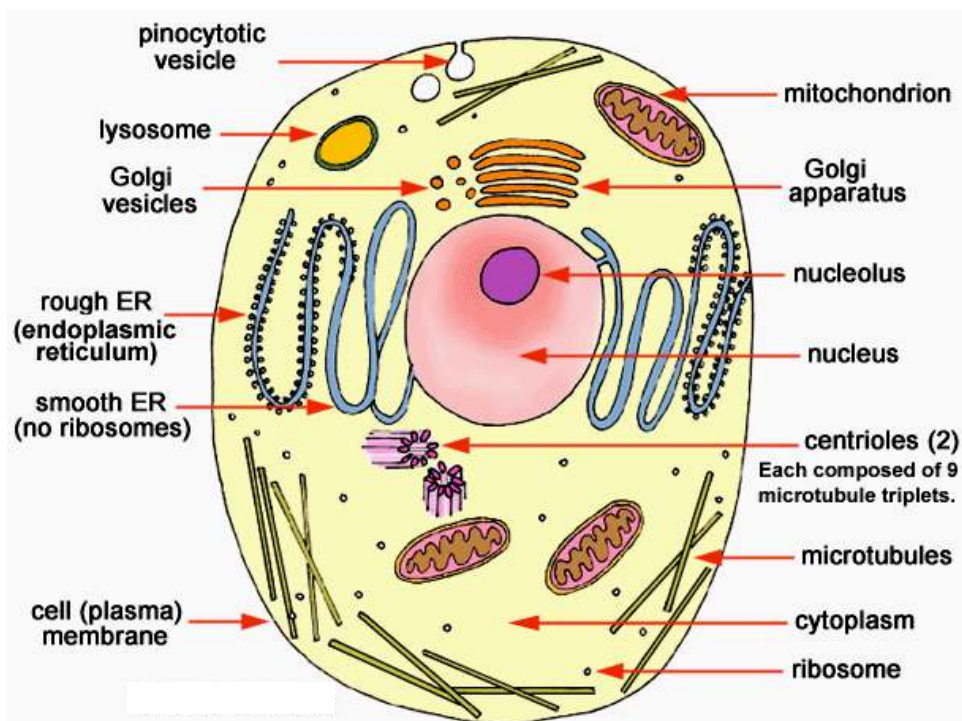
These Slides Accompany the Youtube Video Tutorial:  
<https://www.youtube.com/watch?v=KbHVtTnL8ds>

## Structure of cell :

### Includes

- Cell membrane
- Cytoplasm
- Organelles
- Cytoskeleton
- Inclusion bodies
- Nucleus

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## Cell Membrane Fluid Mosaic Model

The model was proposed by Singer & Nicolson in 1972

**structure of membrane –**

- 7-10 nm(70 to 100 A) in thickness.

Tri layered structure- two electron dense and one electron lucent layer

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- Biochemical composition:
  - Lipids
  - Proteins
  - carbohydrates

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- Lipids --- 40%.
  - Phospholipids (Phosphatidyl choline, Phosphatidyl ethanolamine, Sphingomyelin etc.)
  - Cholesterol
  - Glycolipids

**Functions** : major barrier to water soluble sub. like urea, glucose & ions. but alcohol, oxygen & carbon dioxide can easily pass

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- Proteins -- 50%
  - Glycoproteins
  - Lipoproteins
- Two types
- A.** Integral proteins: run throughout the mem. & act as channel, carriers etc.
- B.** Peripheral proteins: mostly present inside of the mem. & act as enzymes

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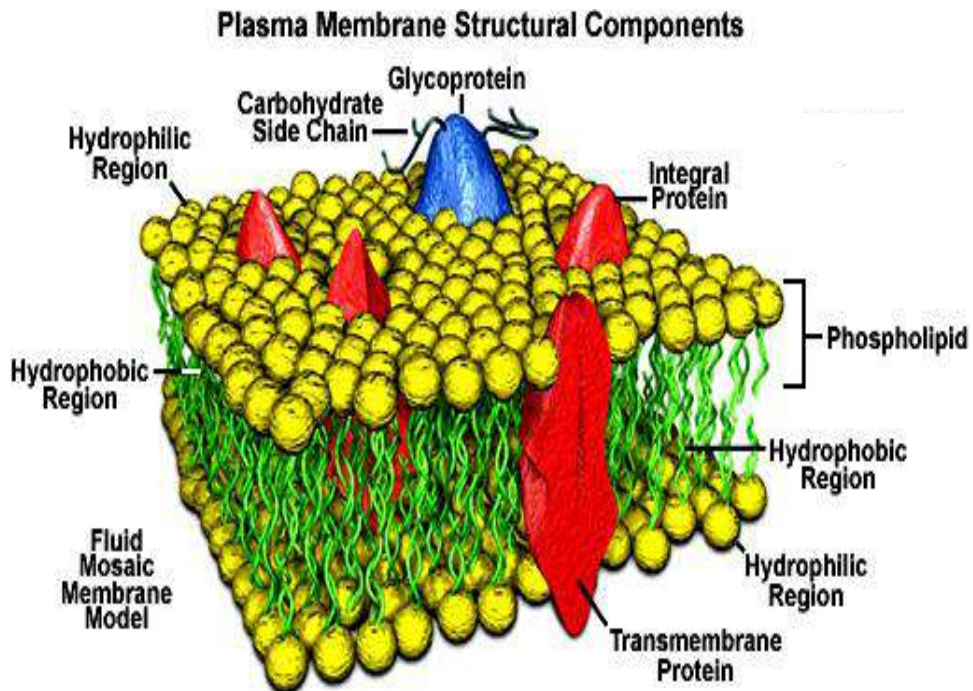
- Carbohydrates --10%
  - Glycoproteins
  - Glycolipids
- Functions;
- Have –ve charge so makes cell surface –ve that repels negative objects

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- Glycocalyx causes attachment of cells to each other
- Some carbohydrates enter into immune reaction
- Many act as receptors for binding hormones like insulin

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## Functions of cell membrane

- 1 Protection
- 2 Selective permeability
- 4 Links adjacent cells together
- 5 Forms glycocalyx
- 6 Participate in immune response

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- 3 Proteins act as
  - channels-voltage gated, ligand gated
  - Carriers
  - Pumps
  - Receptors
  - Contribute to cytoskeleton
  - Serves as enzymes

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## Cytoplasm and organelles

- Cytoplasm is aqueous substance in which organelles are dispersed.

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## Organelles

Organelles are permanent components bounded by limiting membrane. These are:

- Mitochondria, endoplasmic reticulum, ribosomes, golgiapparatus peroxisomes, centrosomes, lysosomes and centrioles

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## Functions of organelles

- **Mitochondria** (power house) makes ATP available
- **Endoplasmic reticulum**
  - RER** - involved in protein synthesis
  - SER** -Site of lipid synthesis
    - Contains enzymes controlling glycolysis
    - Also contain detoxifying enzymes

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- **Ribosomes** attached to RER & composed of RNA
  - Protein synthesis
- **Golgi apparatus**
  - Concen. of proteins & polysaccharides
  - Packaging & formation of vesicles
  - Completion of glycoprotein synthesis

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- **Lysosomes:** intracellular digestive system, contain about 50 different hydrolytic enzymes
  - Make defense system of body
  - Bacteria & debris of dead tissues taken up by the cells are destroyed

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- **Peroxisomes:** contain oxidases mainly present in kidney & liver cells.
  - Detoxify drugs & neutralize free radicals
  - Catalase one of the enzymes, breaks toxic hydrogen peroxide into water & oxygen

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- **Centrioles:** initiates cell division
- **Nucleus:**
  - Responsible for transmission & expression of genetic information
  - Cell reproduction & multiplication
  - Synthesis of RNA

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- **Chromatin:** net work of threads composed of DNA & proteins
- **Chromosomes:** thread like st. formed from chromatin at the time of cell division. *Pass genetic information*
  - There are 23 pairs of chromosomes. 22 are somatic & one pair of sex chromosomes

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## ❖ Inclusion bodies

- Cytoplasmic inclusions (temporary components) are also present. They are not living st.  
These are
  - 1. Stored foods**
- Fat as droplets in a section they look like [signet ring](#)

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- Carbohydrate
- Glycogen can only be stained by PAS (periodic acid-Schiff) & gives a brilliant red colour
- Proteins rarely stored
- **2. Secretary granules** like digestive enzymes synthesized in cytoplasm

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- **3. Pigments**

- A** Endogenous pig.

- Hemoglobin & it's derivatives eg. Hemosiderin,

- Melanin

- B** Exogenous eg. lipofusin, dust, minerals like lead or silver