



goals

# مقرر بيولوجيا الخلية - SCBI 222 ( نظري )

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# محتويات المقرر \ Course contents



- 1- The Cell ( Types + function + size + shape + structure )
- 2- The Cytoplasm ( organelles types )
- 3- The cell membrane OR plasma membrane (function + structure )
- 4- Cell coat OR Glycocalyx
- 5- Mitochondria ( Num + Shape + Structure + Function )
- 6- ER ( Types + Function )
- 7- Golgi bodies ( Position + Structure + Function )
- 8- Lysosomes ( Num + Structure + Function )
- 9- Peroxisomes
- 10- Secretory vesicles
- 11- The nucleus ( Structure + Function )
- 12- nucleic Acids
- 13- Cell Cycle



# The cell

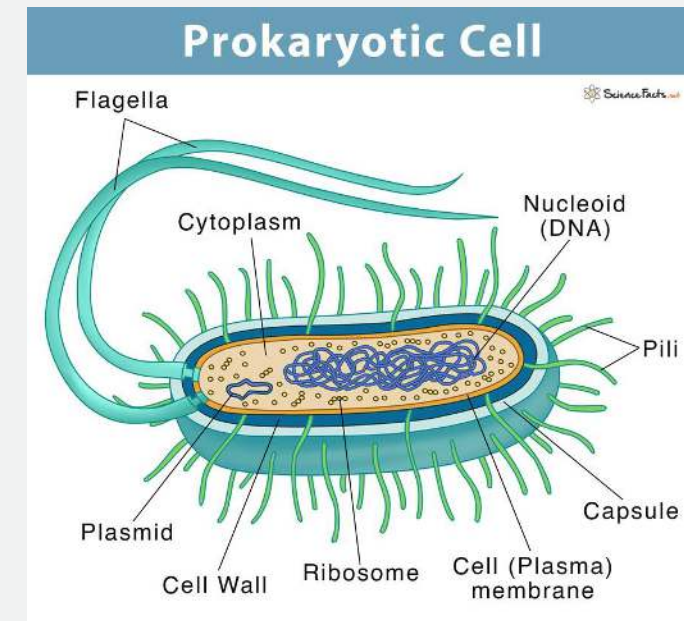


- “ cell ” word comes from latin “ cella ” which is mean “ small room ” )
- The cell is the basic structural , functional and biological unit of all known living organisms
- smallest unit of life that can replicate independently
- Called “ building block of life ”
- Study of cell called “ cytology ” OR “ cell biology ”

**Types of cells :** 1- prokaryotes ( before nucleus ) 2- Eukaryotes ( True nucleus )

1- prokaryotes ( before nucleus ) :

- The smaller + simpler in structure **than num.2**
- Have cell wall outside cell membrane **while num.2 don't have**
- Lack nuclear envelope separate genetic material from other constituentes
- Have no histones bound their DNA
- No membranous organelles
- Found in bacteria ( their shape spherical,spiral and rod - shaped ) + most famous E.coli ( Escherichia coli )
- Their DNA consist of single chromosomes
- nuclear region called “ nucleoid ”





# The cell



## 2- Eukaryotes ( True nucleus )

- Found in fungi ,plants, animals
- Greater in volume than prokaryotes ( before nucleus )
- The main feature is the presence of organelles bound with membrane
- Bound together to form Tissues, Tissues combines to form Organs ( CTO )

### Functions of Eukaryotes ( True nucleus ) :

1- secretion 2- excretion 3- respiration 4-absorption 5- conduction 6- sensations 7- digestion 8- transport ions

### Size of Eukaryotes ( True nucleus )

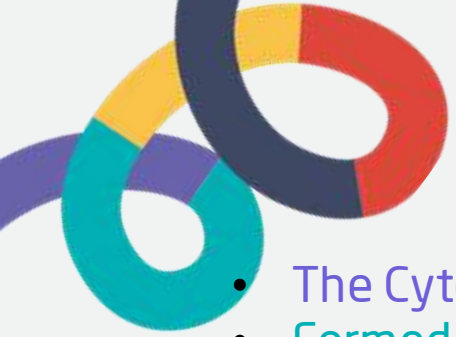
- Different body cells vary in size , EX : cerebellum cells small while muscle and ovarian cells are large

### Shape of Eukaryotes ( True nucleus )

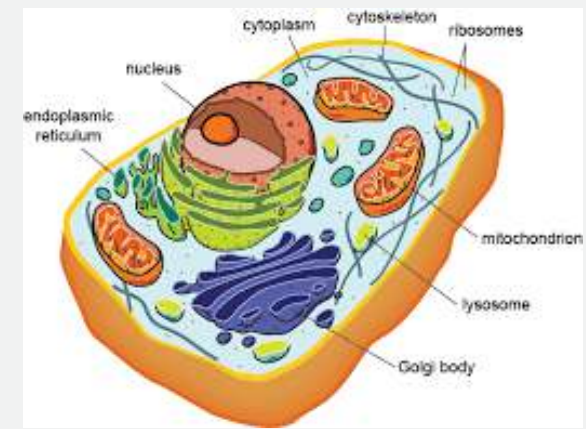
- Different body cells vary in shape , some of them are rounded, oval , flat , cubical , columnar

### Structure of Eukaryotes ( True nucleus )

- Each cell composed of two 2 basic parts : 1- Cytoplasm 2- nucleus



# The Cytoplasm



- The Cytoplasm is a complex structure
- Formed of 4 main components:

A - cell sap OR cytoplasmic matrix : colloidal solution of 1- protein 2- lipids 3- carb 4- minerals 5- enzymes 6- ions

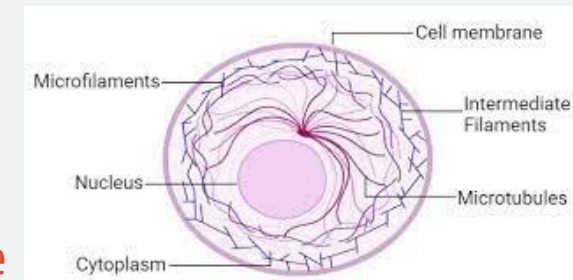
B - cytoplasmic cytoskeleton : supportive network of 1- microfilaments 2- microtubules 3- intermediate filaments

C - cytoplasmic inclusions : temporary components usually act as accumulation stored food such as fat for EX: glycogen OR pigments for EX : melanin + carbon

D - Cytoplasmic organelles ( cell organoids ) : term organelle = small organ , each organelle perform essential functions for the life of a cell

Cell organelles classified into :

- 1- membranous cytoplasmic organelles which are covered by membrane
- 2- Non - membranous cytoplasmic organelles which are Not covered by membrane





# The Cytoplasm



1- **membranous cytoplasmic organelles** which are covered by membrane :

- Present in all nucleated cells
- Permanent components of cytoplasm
- Contain enzymes, EX : lysosomes
- Surrounded with enclosed membrane

The membranous cell organelles include :

- 1- cell membrane OR plasma membrane
- 2- The mitochondria
- 3- The golgi apparatus
- 4- The lysosomes
- 5- The Endoplasmic Reticulum ( Rough + Smooth )
- 6- Peroxisomes
- 7- Secretory Vesicles

2- **Non - membranous cytoplasmic organelles** which are Not covered by membrane :

- 1- Ribosomes
- 2- Centrioles



# Cell membrane



- Called also plasma membrane
- Surrounds the cytoplasm of a cell
- Separates + protects the cell from extra-cellular environment
- Regulates the passage of materials IN + OUT of the cell

The fluid mosaic model is the widely accepted model structure of cell membrane which consists of:

A - phospholipids B - protein C - Carbohydrates

A - The lipids molecules formed of 1- phospholipid, 2- Cholesterol = Arranged as bi-layer, Each phospholipid molecule in plasma membrane formed of 2 regions:

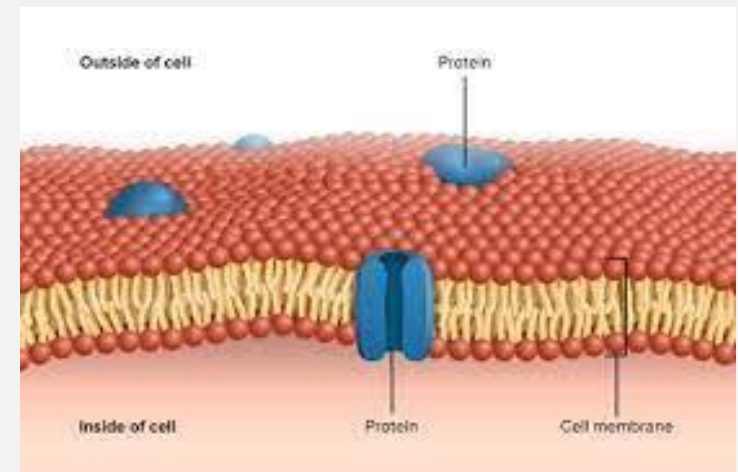
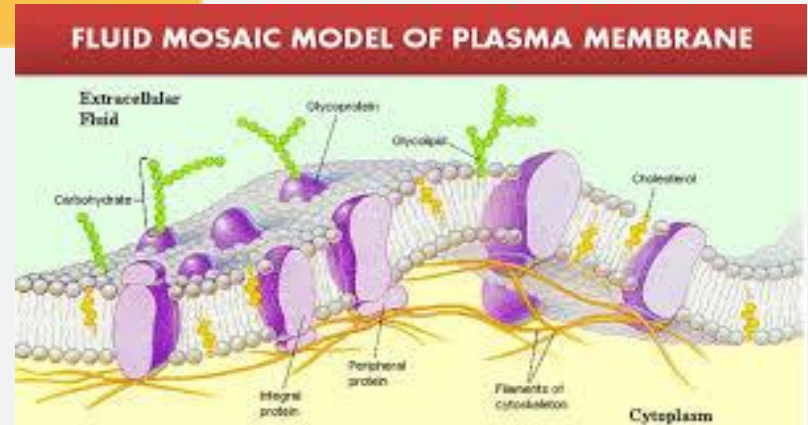
1- Head = hydro-philic lipid ( water - loving )

- charged lipid called polar region
- Directs To-wards the surface of cell membrane

2- Tail = hydro-phobic lipid ( water - hating )

- Non - Charged called Non - polar region
- Directs In-wards so they face each other in the central of cell membrane

2- Cholesterol ( cement ) : also bilayer +1-preventing too close of the phospholipid tails  
+ 2-filling the Gaps between the tails  
+ 3- regulate fluidity and stabilize the phospholipid bilayer





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