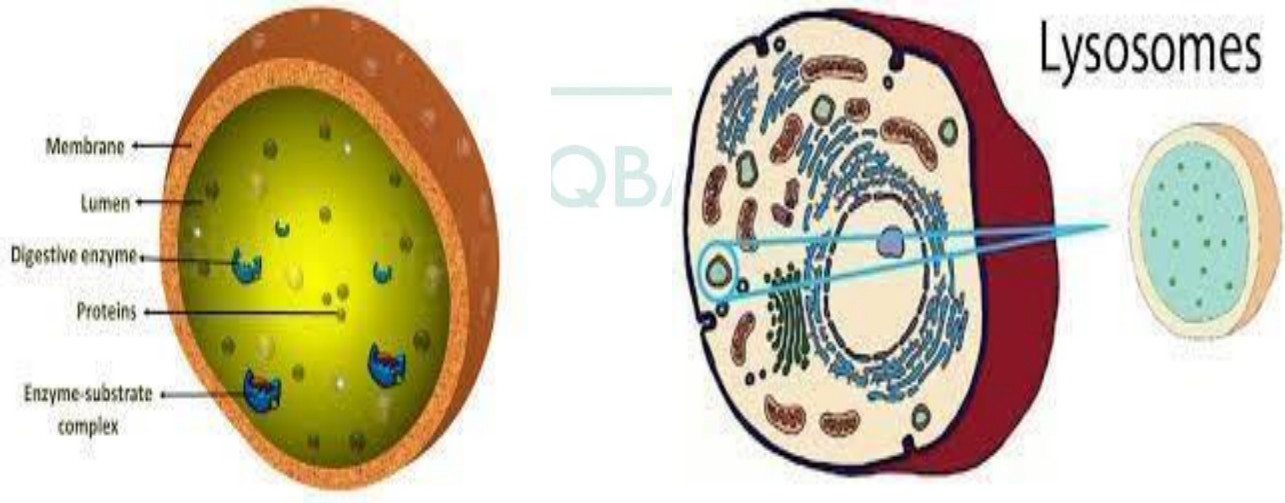
Composition of The cell

Lysosome

Lysosomes are the membrane bounded vesicle produced by Golgi apparatus in animal cells and plant cells , lysosomes contains about **50 different degradative enzymes** that **can hydrolyze** proteins , nucleic acids , carbohydrates and lipids , the most common enzymes are :

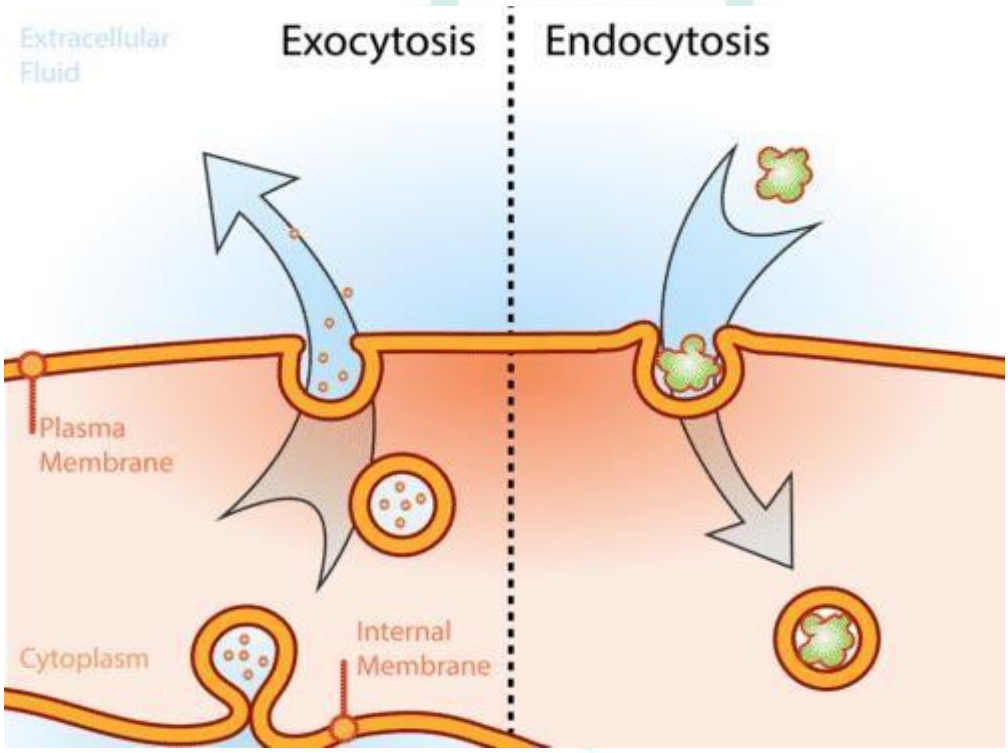
- ribonuclease.
- deoxyribonuclease.
- phosphatase.
- Phosphoprotien phosphatase.
- Proteases.
- Lipase.



Lysosome as the **digestive system** of the cell ,

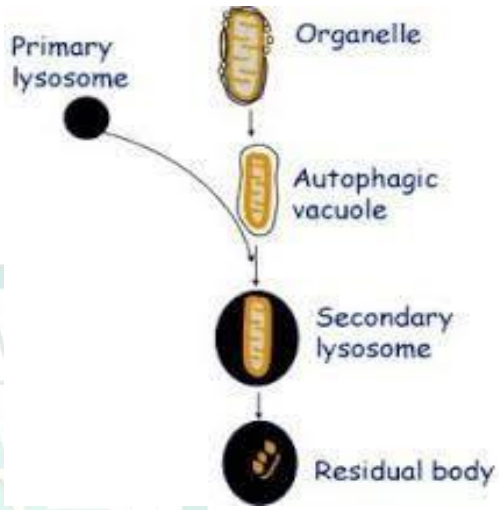
1- degrade materials taken up from outside the cell (**endocytosis**).

2- digest absolute components of the cell itself called (**auto digestion**) example : the finger of a human embryo are at first webbed but they are freed from one another as a result of lysosome action.



- **4-Residual bodies**: are formed if the digestion incomplete. In some cells, ex: amoeba and other protozoa.
  - lysosomes having undigested material or debris are called **residual bodies** , These bodies are formed due to lack of certain enzymes in lysosomes.
  - These are rejected from the cell by exocytosis and some time in certain cells these bodies remain in cells for long time causing **ageing**.
  - These residual bodies also **cause diseases in man** such as
    - ✓ fever

- ✓ hepatitis
- ✓ hypertension
- ✓ congested heart failure



Function of Lysosomes:

1- The lysosome enzyme can break all types of macromolecules into micro molecules such as: proteins into peptides.

2- During development and body growth , Lysosomes are responsible for the **removal** of an unwanted tissue and waste product.

3- Digestion of extracellular materials ex: during bone development osteoclasts ((which are one type of cells present in bone tissue)) release enzyme of secondary Lysosomes by exocytosis to **remolding** the bone.

4- Lysosomes in the white blood cells and macrophages are essential in the **defense** against bacteria and viruses

1- Chromatin

- Chromatin is a complex of macromolecules composed of DNA, RNA, and protein, which is found inside the nucleus of eukaryotic cells. Chromatin exists in two forms:

1- heterochromatin (condensed)

2- euchromatin (extended).

- The primary protein components of chromatin are histones that help to organize DNA into “bead-like” structures called nucleosomes by providing a base on which the DNA can be enfolded around.

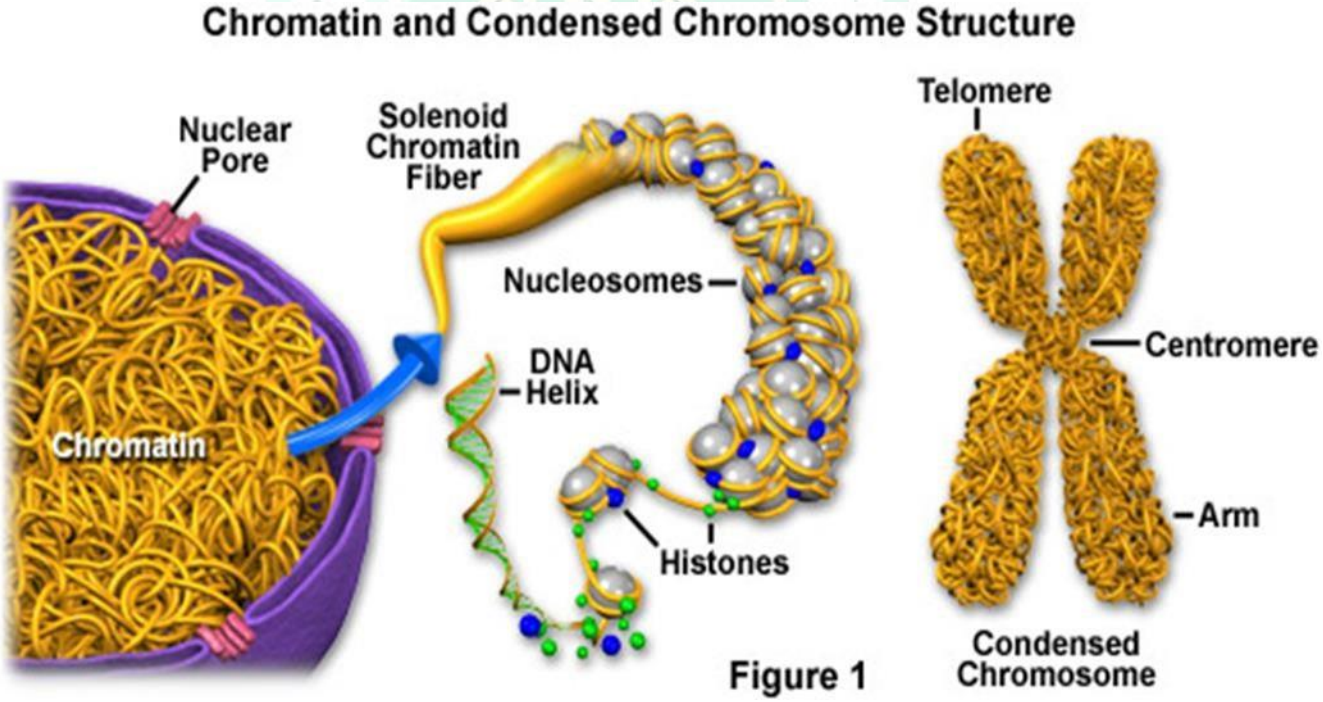
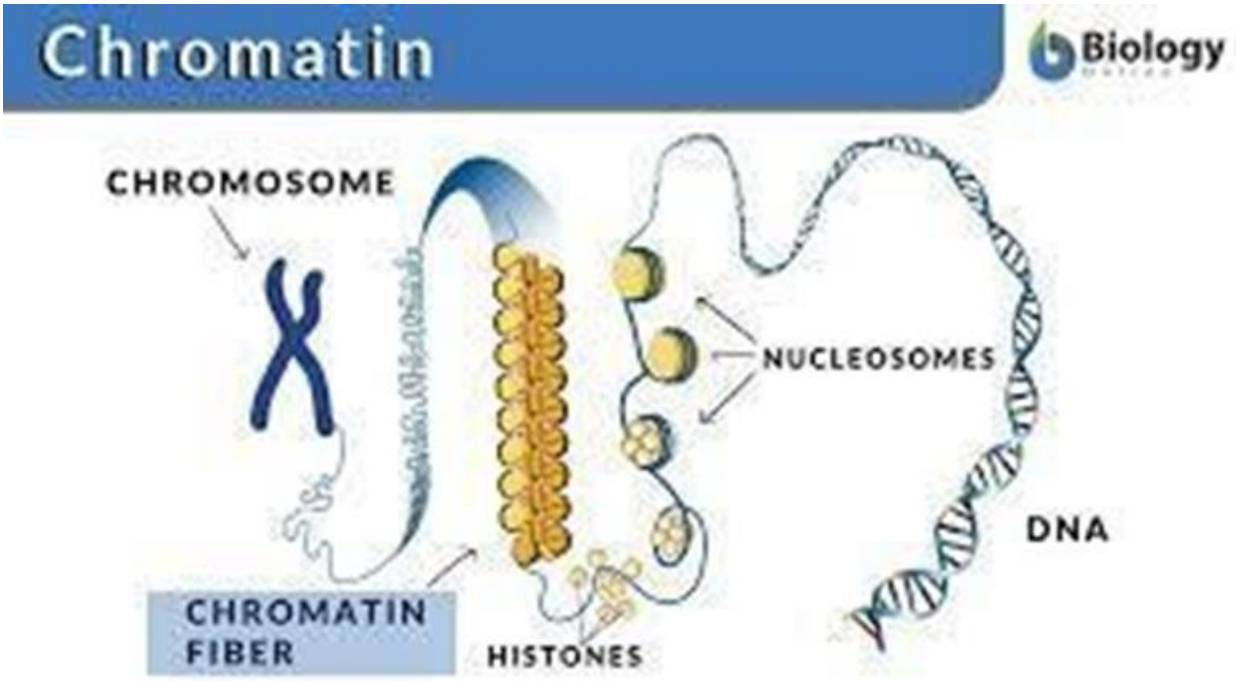


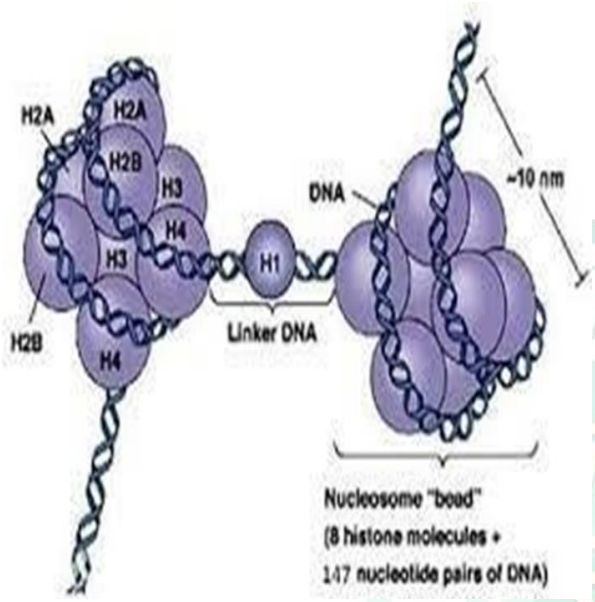
Figure 1

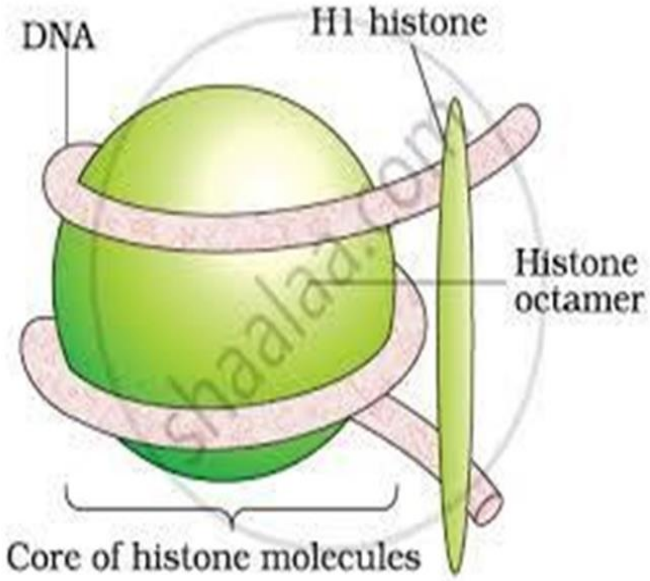


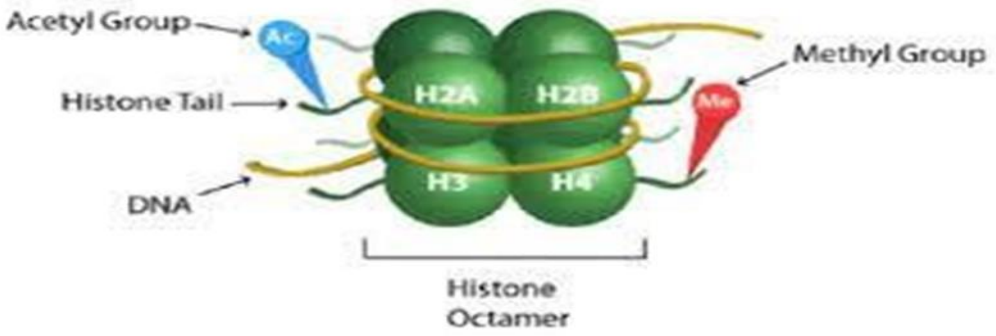
- A nucleosome consists of 147 base pairs of DNA that is enfolded around a set of 8 histones called an octomer .

- The nucleosome can be further folded to produce the chromatin fiber. Chromatin fibers are coiled and condensed to form chromosomes.

- Chromatin makes it possible for a number of cell processes to occur including DNA replication, transcription, DNA repair, genetic recombination, and cell division.







During the cell division processes of mitosis and meiosis, chromosomes replicate to ensure that each new daughter cell receives the correct number of .chromosomes

- A duplicated chromosome is double-stranded. The two strands are identical and connected at a central region called the centromere.