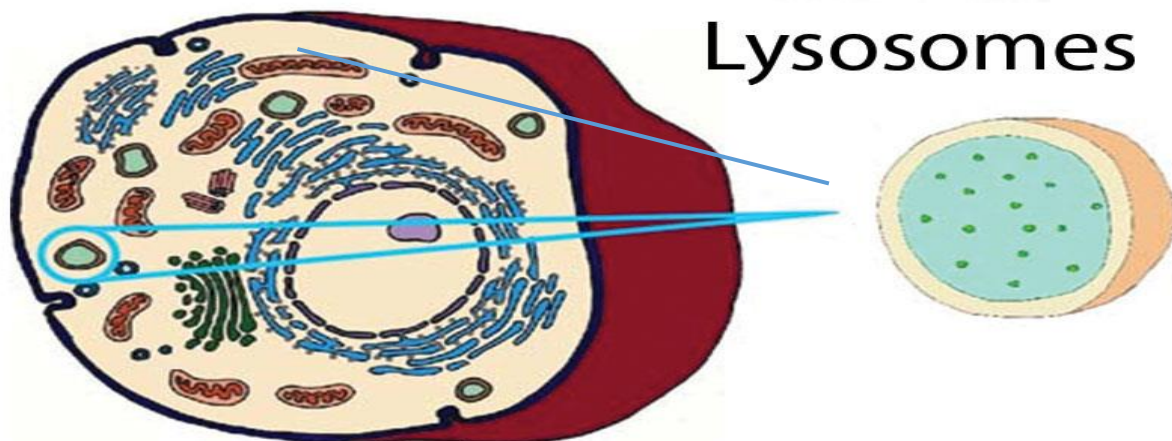
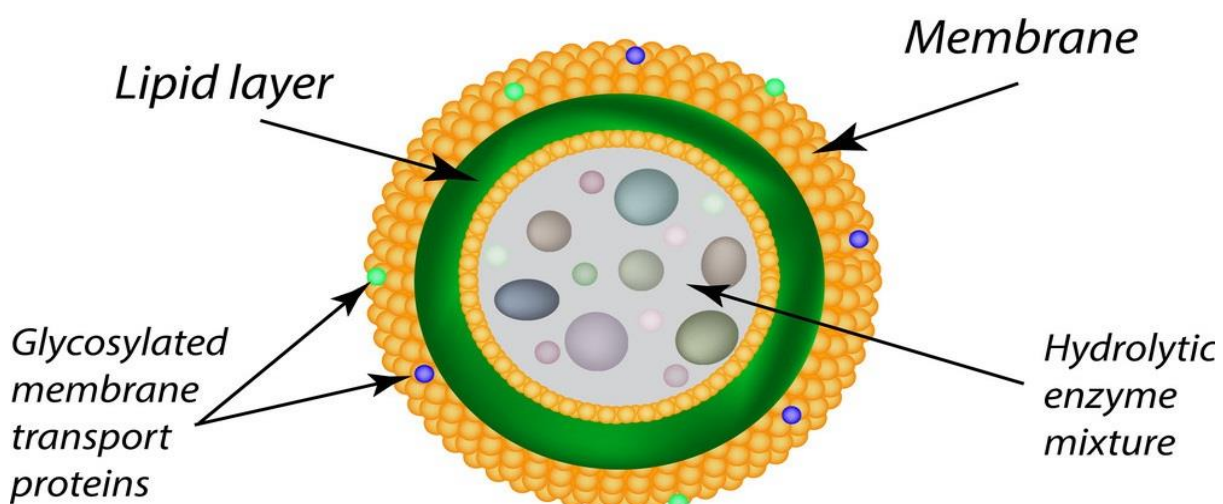


Lysosome: Structure

Lysosomes are the organelles found inside all cells, that contain digestive enzymes. They digest excess or worn out organelles, food particles, and engulfed viruses or bacteria and play a key role to waste removal of cells. Lysosomes are like the stomach of the cell.



Lysosomes are without any characteristic shape or structure i.e. they are pleomorphic. Their appearance is mostly globular or granular. Size ranges from 0.2-0.5 μm and is surrounded by a single lipoprotein membrane unique in composition. The membrane contains highly glycosylated **lysosomal associated membrane proteins (LAMP)** and **Lysosomal integral membrane proteins (LIMP)**. LAMPs and LIMPs form a coat on the inner surface of the membrane and protect the membrane from attack by the numerous hydrolytic enzymes retained inside it. The lysosomal membrane has a hydrogen proton pump which is responsible for maintaining pH conditions of the enzymes. The acidic medium maintained by the proton pump that pumps H^+ inside the lumen, ensures the functionality of the lysosomal enzymes. Inside the membrane, the organelle contains enzymes in the crystalline form.



For degradation of extra and intracellular material, lysosomes filled with enzymes called hydrolases. It contains about 40 varieties of enzymes which are classified into the following main types, namely:

- **Proteases**, which digest proteins.
- **Lipases**, which digest lipids.
- **Amylase**, which digests carbohydrates.
- **Nucleases**, which digest nucleic acids.
- **Phosphoric acid monoesters**.

Collectively the group of enzymes is called hydrolases which cause cleavage of substrates by the addition of water molecules.

Function: Lysosomes serve two major functions-

1. **Intracellular Digestion**

- To digest food, the lysosomal membrane fuses with the membrane of food vacuole and release the enzymes inside.
- The digested food then diffuses through the vacuole membrane and enters the cell to be used for energy and growth.

2. **Autolytic Action**

- Cell organelles that need to be get ridden are covered by vesicles or vacuoles by the process of autophagy to form autophagosome.
- The autophagosome is then destroyed by the action of lysosomal enzymes.

Processes in which lysosomes play crucial roles include: **Heterophagy, Autophagy, Extracellular Digestion, Autolysis, Fertilization** (The acrosome of the sperm head is a giant lysosome that ruptures and releases enzymes on the surface of the egg. This provides the way for sperm entry into the egg by digesting the egg membrane.) Lysosomes remove 'junk' that may accumulate in the cell helping to prevent diseases.