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COMMISSIONERATE OF COLLEGIATE EDUCATION



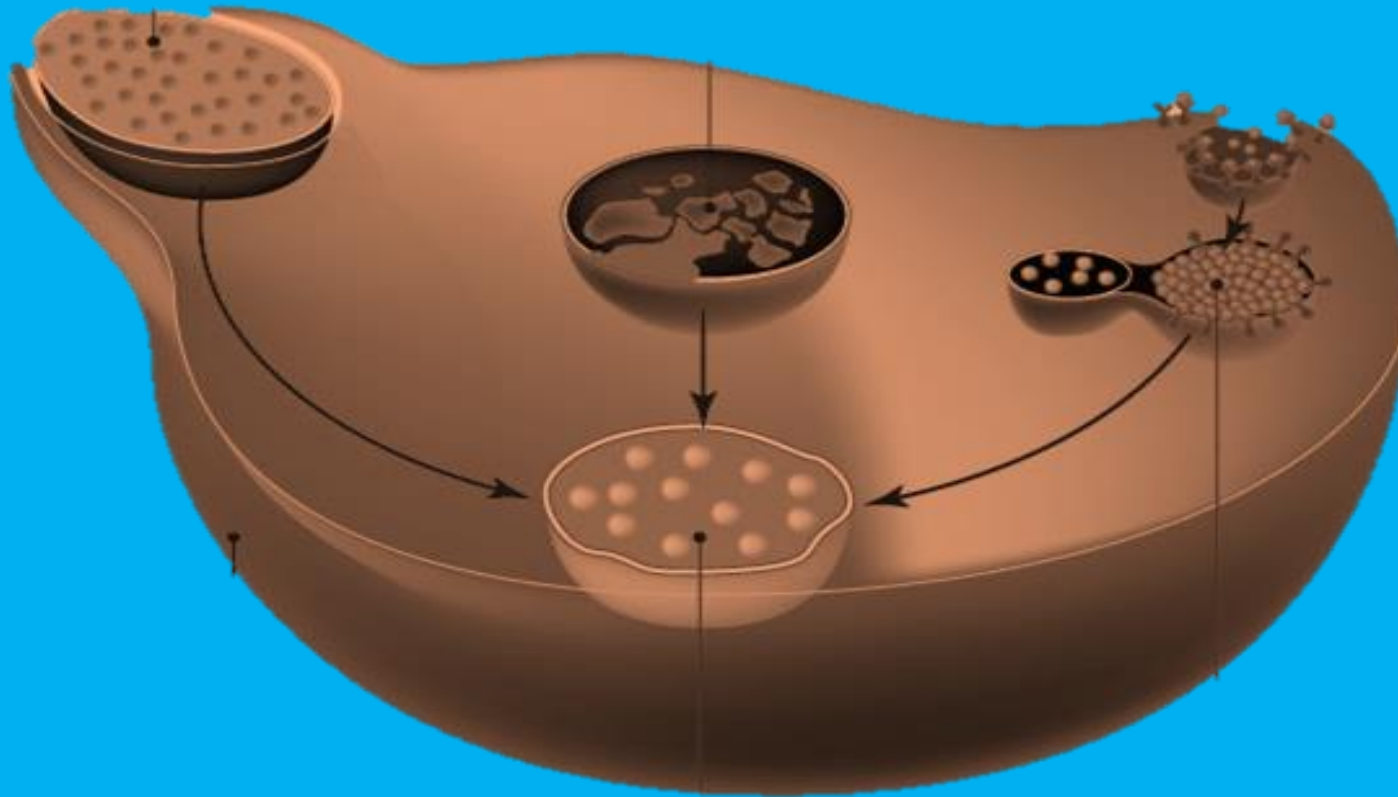
Structure and Functions of the Lysosomes Zoology

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STRUCTURE and FUNCTIONS of LYSOSOMES



Learning Outcomes

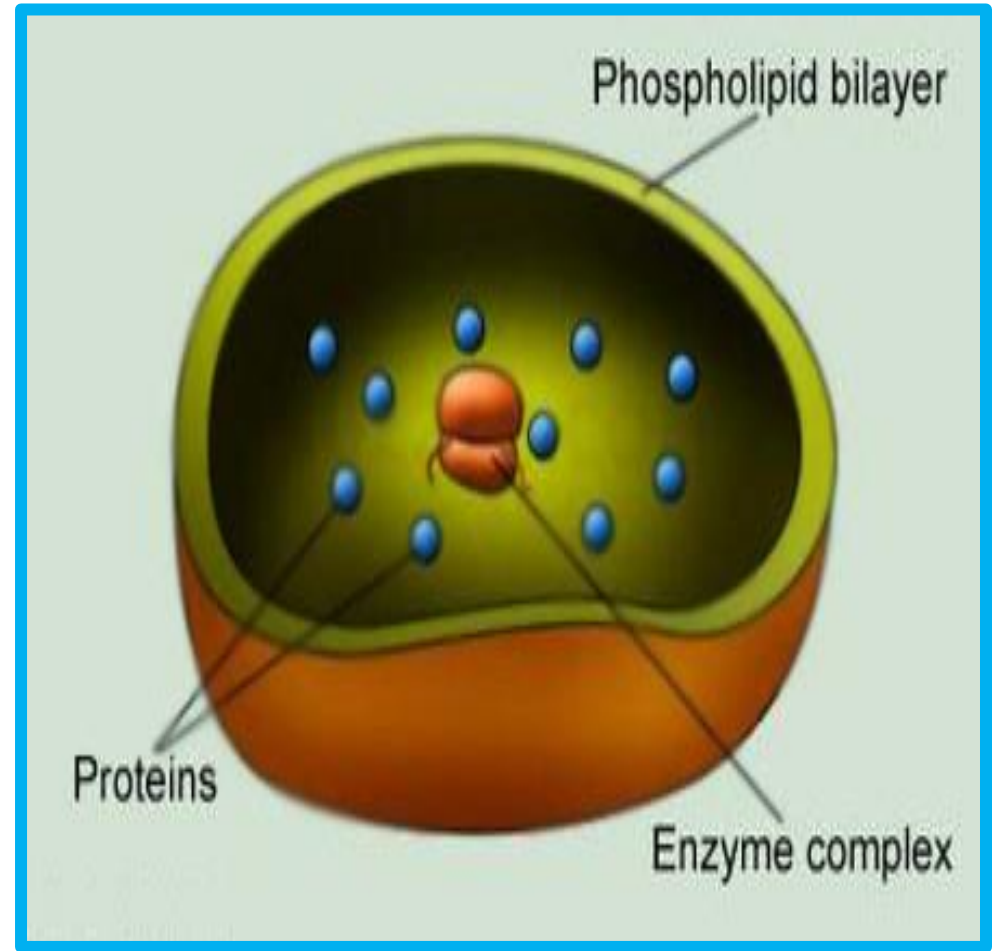
- Introduction
- Structure of Lysosomes
- Formation of Lysosomes
- Polymorphism in Lysosomes
- Functions of the Lysosomes

INTRODUCTION

- Discovered and Named? Christian.De Duve in 1955
- Some common names for the Lysosomes
 1. Perinuclear dense bodies
 2. Cell's garbage disposal organs.
 3. Suicidal bags of the cell
- Enzymes are said to be acid hydrolases
- Work actively at low pH level

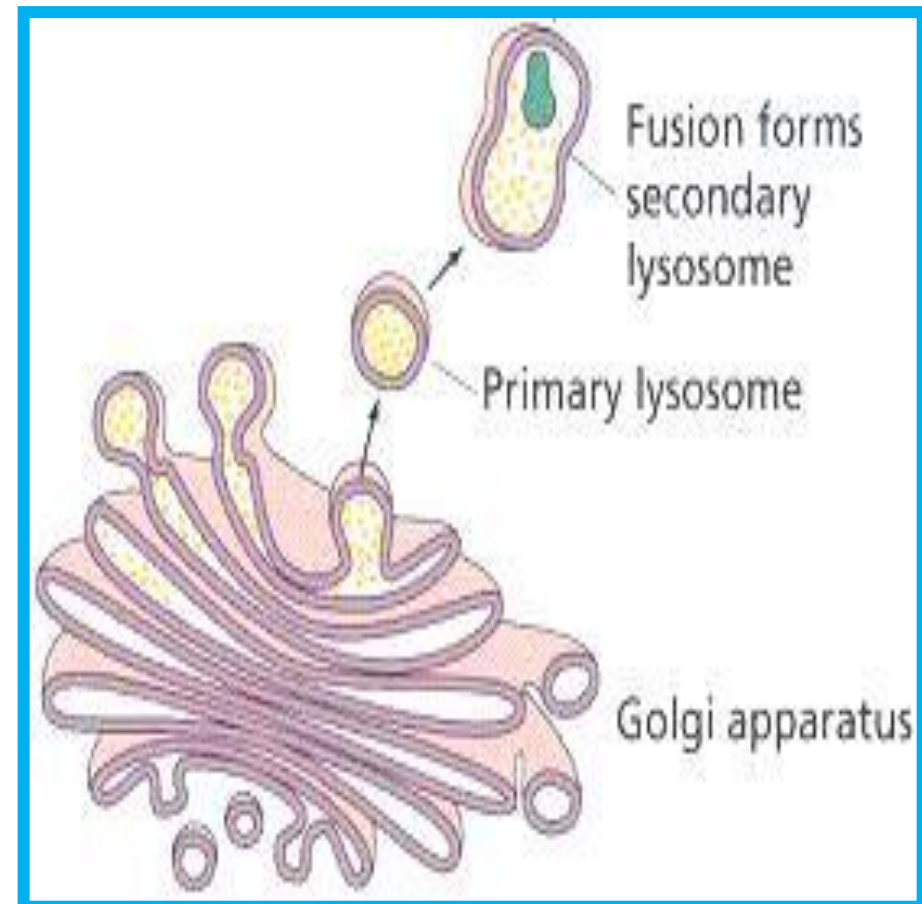
STRUCTURE OF LYSOSOME

- Size
- Shape
- Appearance
- Granular Vesicles
- Bounded by single membrane with Lipo proteins
- Contains hydrolytic enzymes



FORMATION OF LYSOSOMES

Lysosomes are believed to be formed by joint action of Golgi complex and endoplasmic reticulum.



FORMATION OF LYSOSOMES



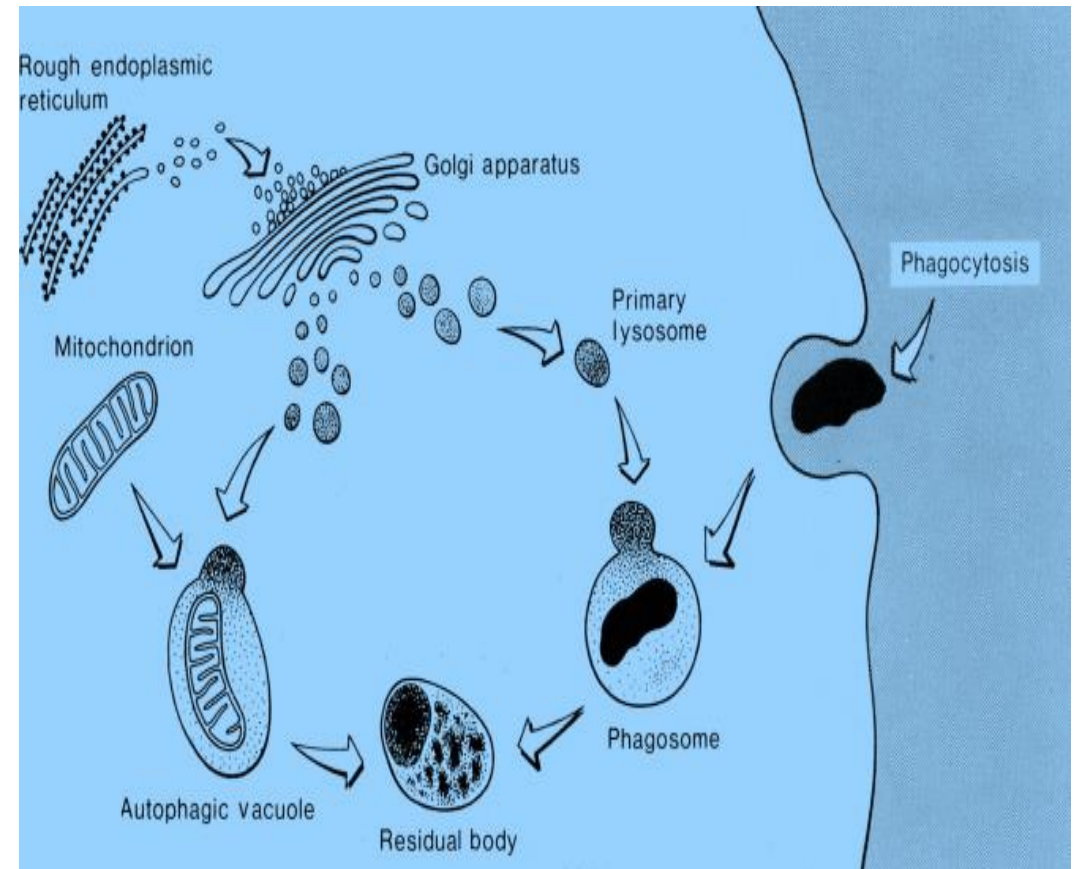
POLYMORPHISM IN LYSOSOMES

Lysosomes are said to be polymorphic organelles as they occur more than one form inside the cell. They differ in structurally and Functionally. There are 4 types of Lysosomes

1. Primary Lysosomes
2. Secondary Lysosomes
3. Autophagic Vacuoles
4. Residual bodies

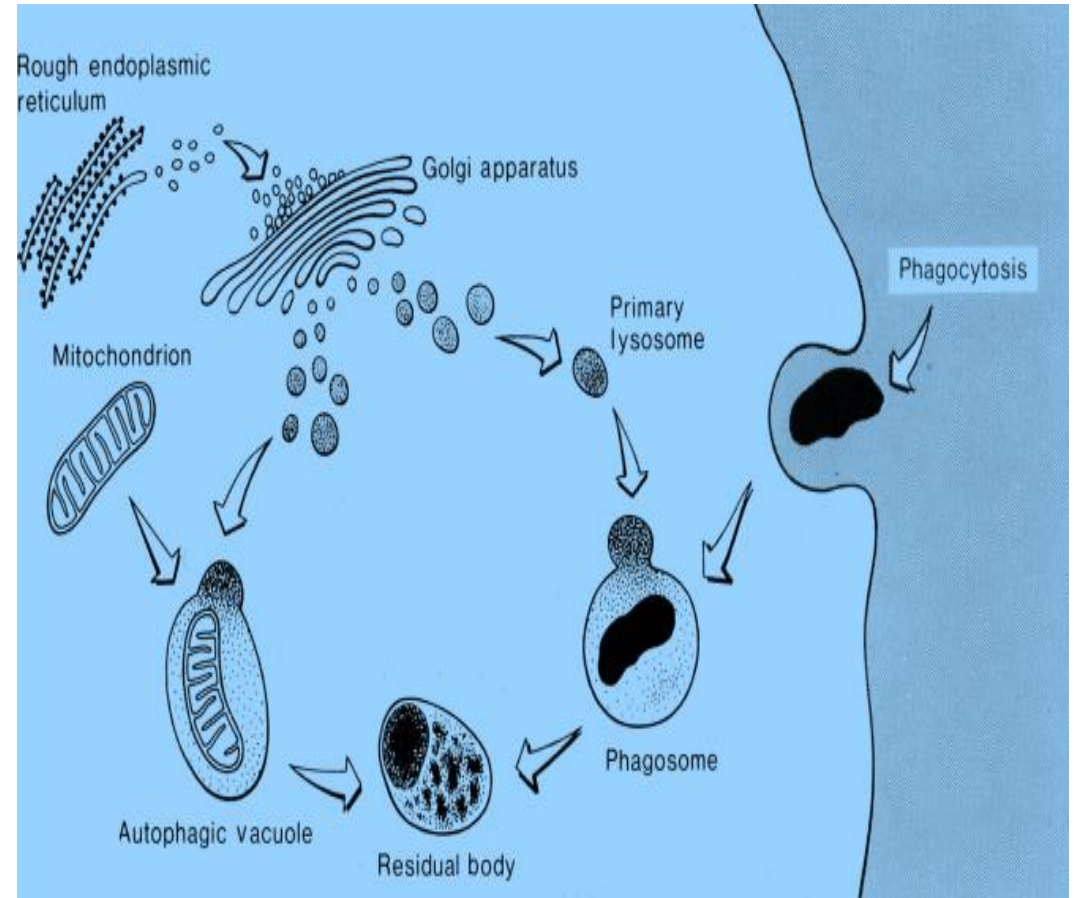
1.PRIMARY LYSOSOMES

- They are small sac like structures with digestive enzymes.
- Since they store enzymes they are also known as storage granules.
- Believed to be derived or pinched off from the Golgi complex.



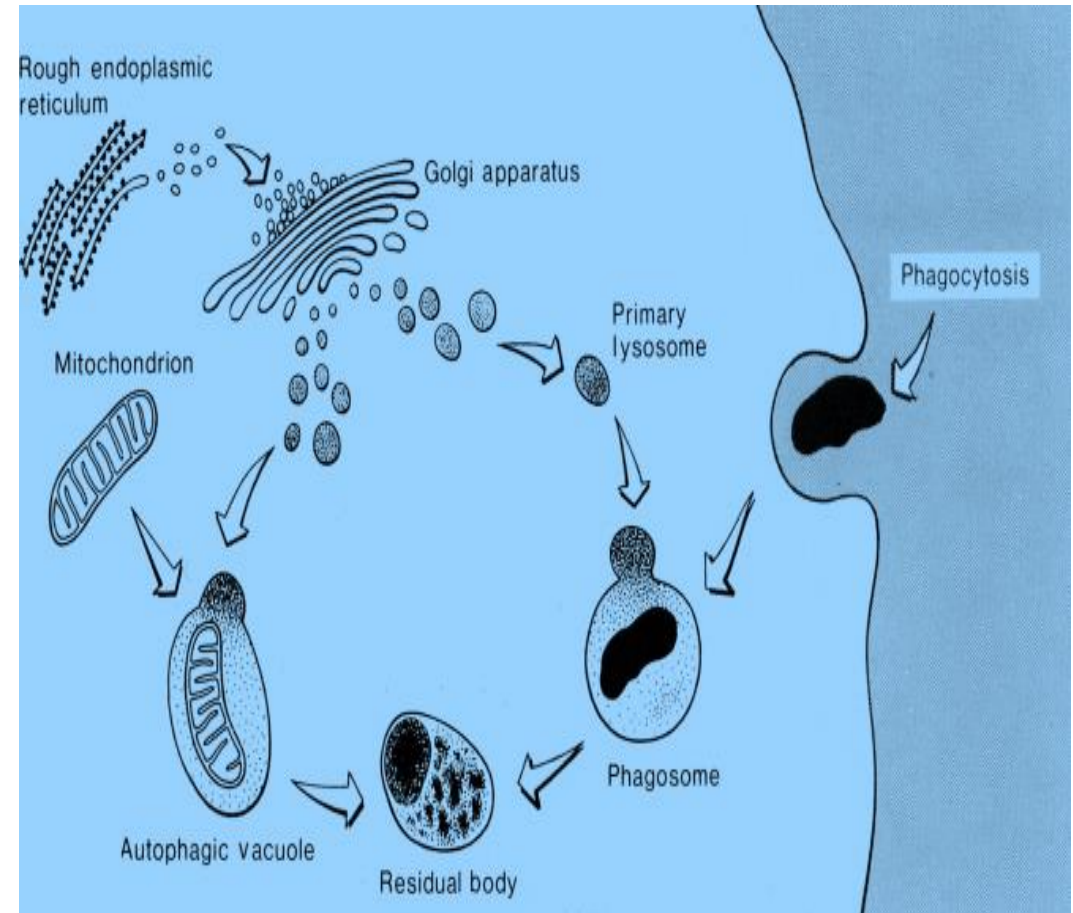
2.SECONDARY LYSOSOMES

- They are formed by the fusion of Primary lysosomes with phagosomes or pinosomes.
- Once the fusion is over the engulfed material is progressively digested by the enzymes present in primary lysosomes.
- Secondary lysosomes then are called digestive vacuoles.



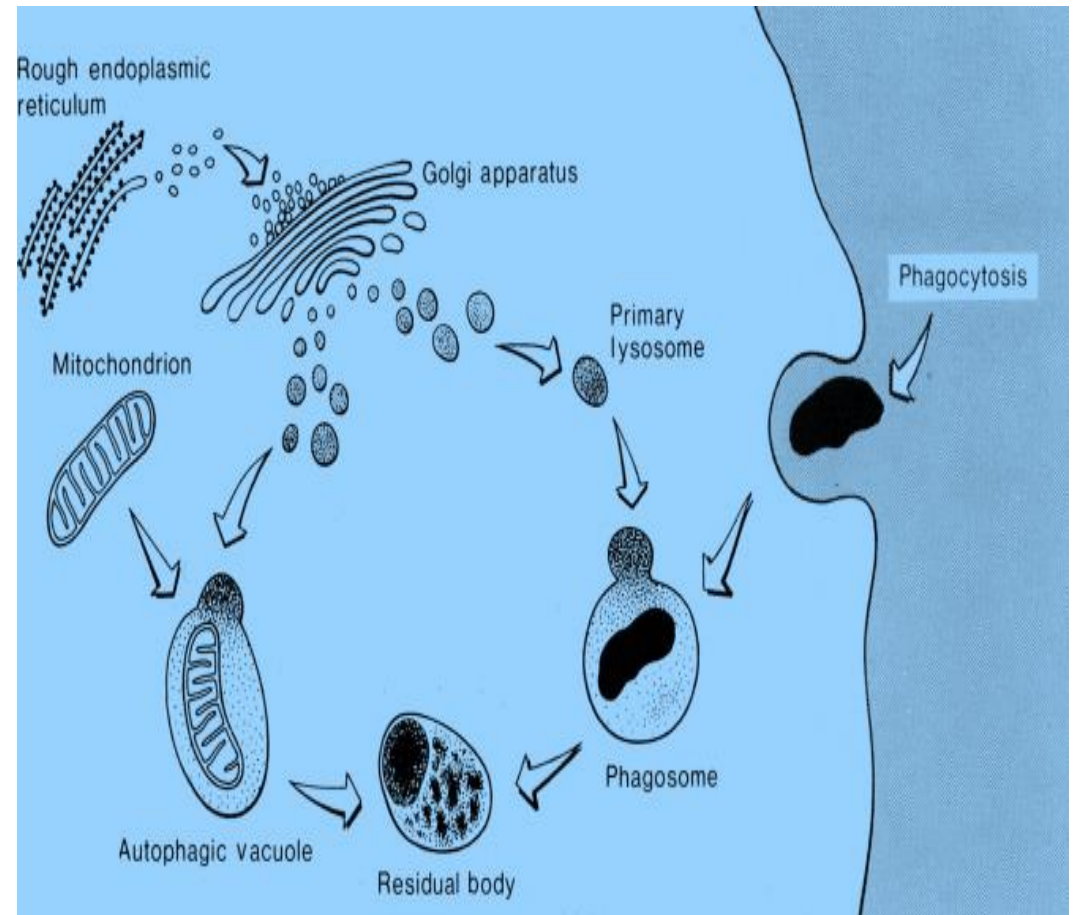
3.AUTOPHAGY VACUOLES

- These are formed when the cells feed on their own intra cellular organelles such as mitochondria, ER etc., and they digest them ultimately.
- This happens only during starvation.
- Lysosomes performing autolysis do not enclose the structure to be broken down. Instead they themselves burst to release the digestive enzymes.



4. RESIDUAL BODIES

- The secondary lysosomes and autophagic vacuoles with undigested waste are called residual lysosomes.
- The residual bodies are also called “telo lysosomes” or “dense bodies”.
- These represents the final stages of breakdown of foreign material or cellular organelles by the lysosome

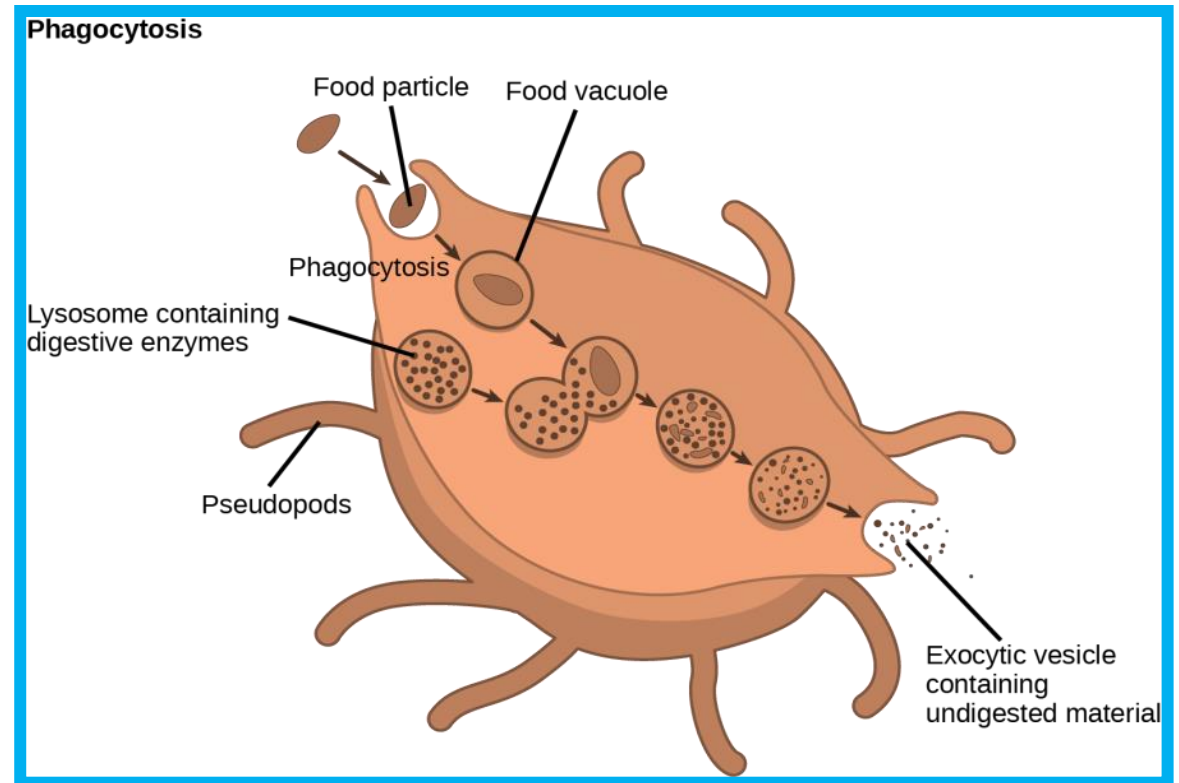


FUNCTIONS OF THE LYSOSOMES

1. Extra cellular Digestion.
2. Intra cellular Digestion/Autophagy
3. Autolysis
4. Acrosome formation -- Fertilization.

Extra Cellular Digestion

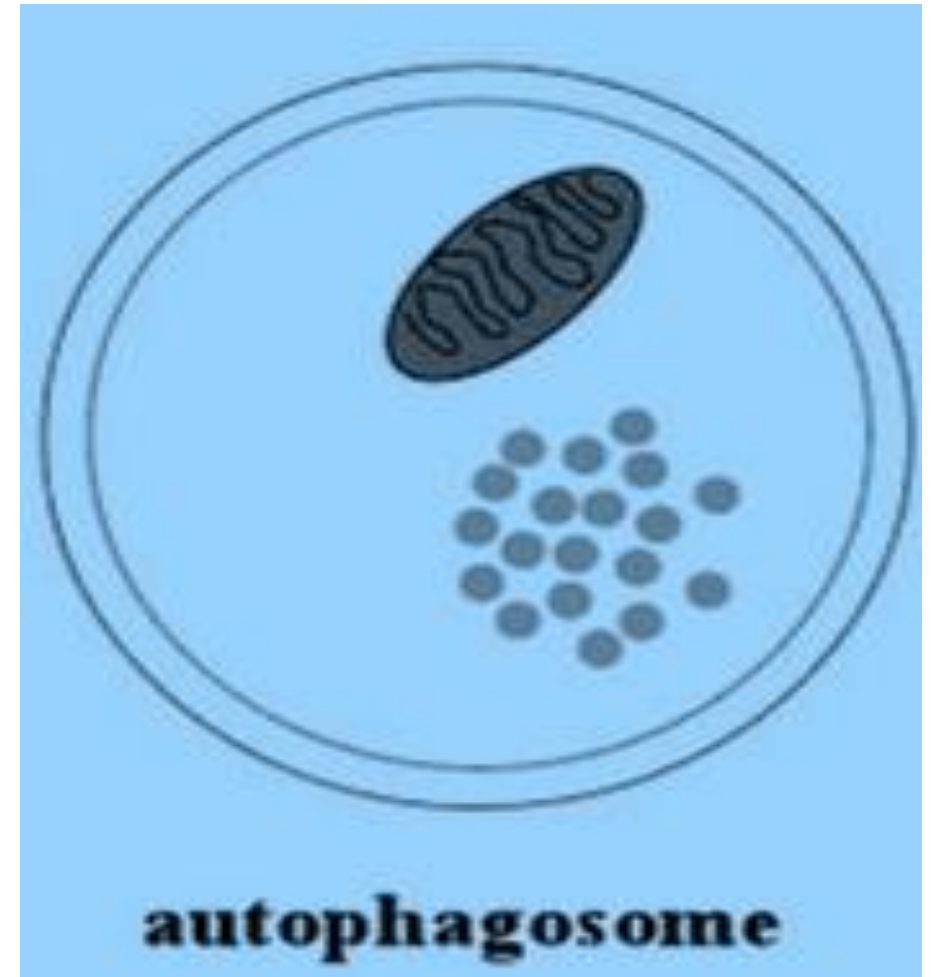
- It is the lysosomal digestion of the extra cellular material.
- The food materials enclosed in vesicles called phagosomes or phenosomes.
- These vesicles fuse with lysosomes to form hetero phagosomes.
- The enzymes of lysosomes digest the food material, which diffuses in to the cytoplasm through the hetero phagosome membrane.



<https://www.assignmentpoint.com/wp-content/uploads/2017/05/Lysosome0.jpg>

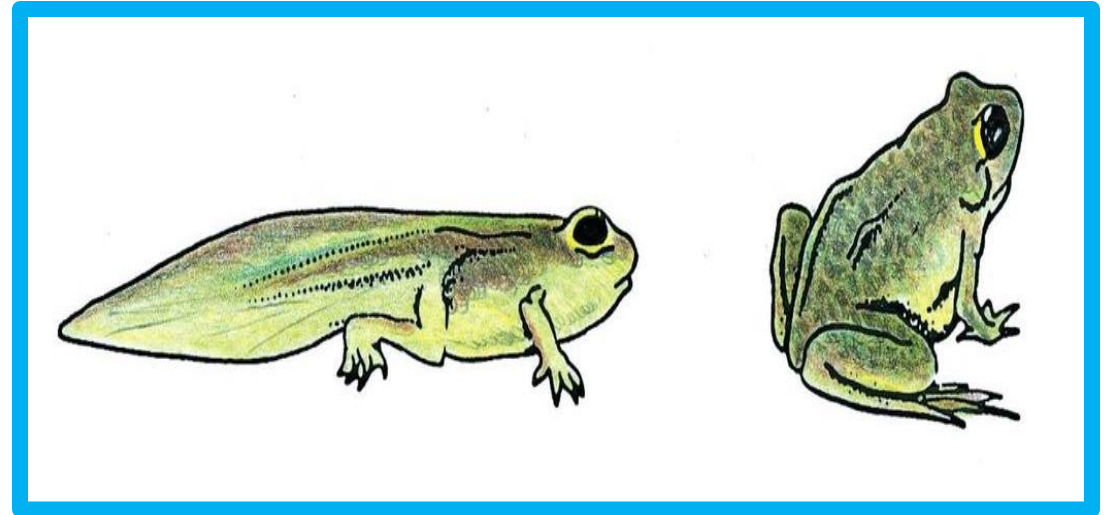
Intra cellular Digestion/Autophagy

- It is also known as Autophagy.
- It refers to the digestion of intra cellular food materials.
- In autophagy the cell organelles, worn out cells, dead cells, cell debris and stored food materials are digested by the lysosomes.



AUTOLYSIS

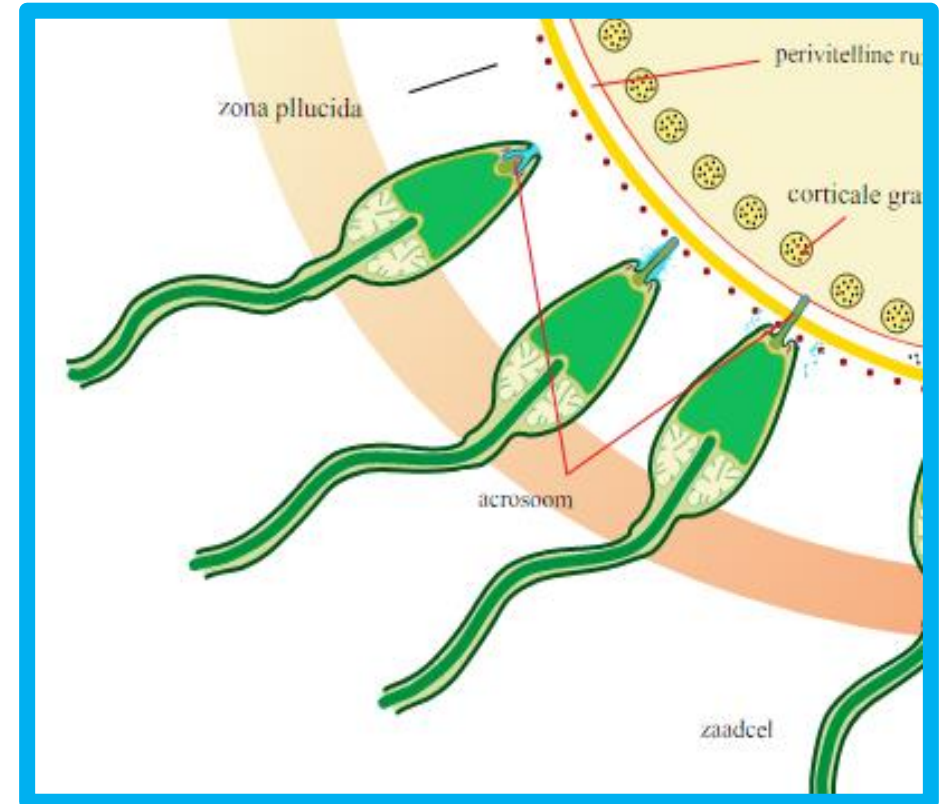
- It is the self-digestion, in autolysis the lysosomes digest its own cell. In this process the lysosome ruptures inside its cell and releases enzymes which digest and degrade the cell.
- Autolysis occurs during amphibian metamorphosis and menstruation etc.,
- During amphibian metamorphosis the cells in the tail are digested by autolysis.
- Similarly during menstruation the cells in the uterine epithelium are lysed by autolysis.



<https://slideplayer.com/slide/15095953/91/images/7/Programmed+cell+death+eliminates+unwanted+cells.jpg>

Acrosome ..Fertilization

- During fertilization the acrosome of sperm ruptures and releases enzymes such as hyaluronidase , protease etc,.
- These enzymes dissolve the egg membrane and make way for the entry of sperm in to the egg.



Extreme Actions of Lysosomes

- Some times Lysosomes present in the Lungs will become damage due to the accumulation of Silica in the Lungs. So the enzymes present in the Lysosomes are released and can harm the Lungs .
- An enzyme called DNA ase in the lysosomes destroy the DNA part of molecule called Deletion. If this deletion may occur in 21st chromosome of the humans it can cause Leukemia

Brief Summary

Lytic means soluble/digest. The name derived for these cell organelles as they have digestive properties. Lysosomes were discovered by Christian de Duve.

Lysosomes are rich in the cells that perform digestive and hydrolytic functions

Lysosomes are ovoid or round cells with granules formed from the cisternae edges of the Golgi complex.

Poly morphism in Lysosomes:

1. Primary lysosomes, 2. secondary lysosomes, 3. autophagosomes, 4. Residual bodies

Functions of lysosomes:

1. Extracellular digestion 2. Intracellular digestion or autophagy,
3. Autolysis 4. Acrosome .. Fertilization

Extreme Actions of Lysosomes causes damage to the lungs and can cause Leukemia

thank
you

