Date-09/06/2021 (B-Sc-I) LYSOSOMES-(2nd) (Zool Hons)

Kinds of lysosomes or Polymorphism in lysosomes

Four types of lysosomes have been observed in different types of cells and at different times even within a single cell.

(I) primary lysosomes.
(II) Secondary lysosomes.
(III) Residual bodies.
(IV) Autophagic Vacuoles or cytolysosomes.

(I) **primary lysosomes** :— (i) Newly formed lysosomes are called primary lysosomes. These contain enzymes synthesized by ribosomes attached to endoplasmic reticulum.

(ii) These are formed either directly from the endoplasmic reticulum or indirectly from the Golgi Complex by a process similar to budding (DAYSON — 1978). it can secrete its enzymes outside the cell or store them. it is also known as storage granules.

(II) **Secondary lysosomes** :— Ingestion of materials by the cell either by pinocytosis or by phagocytosis

results in the formation of a membrane bound vesicle known as pinocyte or phagocyte. The ultimate fusion of these pinosomes with the pre-existing primary lysosomes leads to the formation of secondary lysosomes.

Formation of the latter causes mixing of lysosomal hydrolases with the ingested material finally resulting in the break down of the ~~beast~~ latter. Hence these are also known as hetero-phagosomes or digested vacuoles.

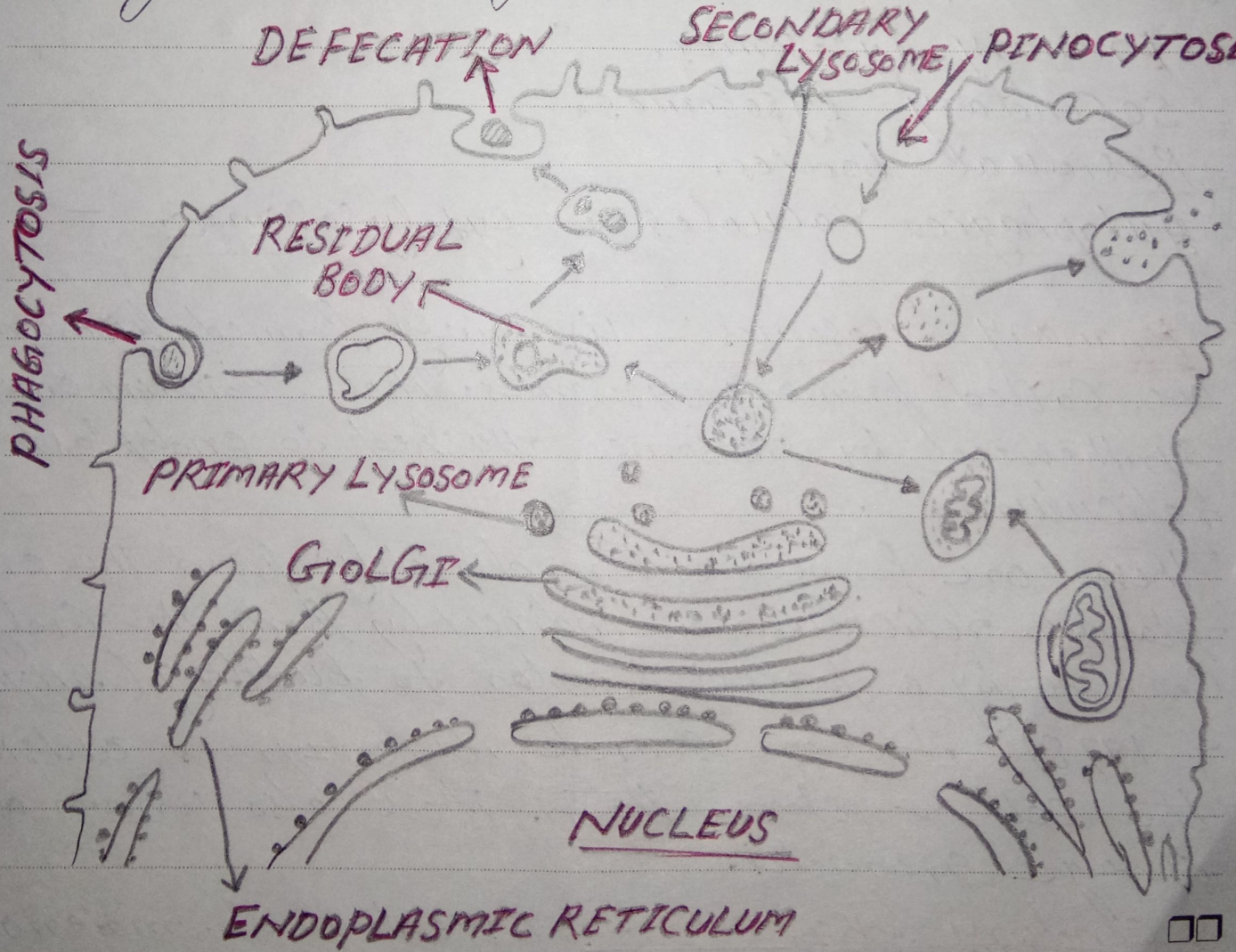

Fig:- Stages of formation of lysosomes.

(iii) **Residual bodies :—** (i) Inspite of every efficiency of lysosomes for digestion, some ingested materials are sometimes left undigested.

(ii) The lysosomes containing undigested material like myelin bodies are known as residual bodies.

(iii) In Amoeba and some other protozoans the resi-dual bodies are removed by defecation.

But in other cases it may persist in the cell for a long period and may be important in the aging of the cell. The age of an animal can often be estimated from their concentration.

(iv) **Autophagic vacuole or cytolysosomes :—** Lysosomes containing some part of the cell indigestion is known as autophagic vacuole or cytolysosom-es. This type of digestion of intracellular structures is called autolysis (self destruction) This happens during starvation, after injury or during the remodeling. These contained part may be various cell organelles like mitochondria endoplasmic reticulum etc.

Thus These serves as devices for achieving breakdown of parts of the cell without causing a damage to the cell as a whole. lysosomes Containing remnants of mitochondria Can be faimd in the liver cells during starvation.

FUNCTIONS ——

The important functions of a the lysosomes are as follows: ——

(1) **Digestion of large extracellular particles:** ——

The hydrolytic enzymes Contained in the lysoso-mes digest the fluid substances & solid particles brought into the cell by pinocytosis and phagocy-tosis respectively. The lysosomes of leucocytes enable the latter to devour the foreign proteins, bacteria and viruses.

(2) **Digestion of intracellular digestion:** ——

During starvation the lysosomes digest the stored food Contents such as protein, lipids and Carbohydrates (glycogen) of the cytoplasm and supply to the cell necessary amount of energy.

(3) **Autolysis:** —— Digestion of intracellular structures by lysosomal enzymes is known as autolysis or cellular autophagy. □□

This happens in certain pathological conditions. This process also serves as an useful mechanism in breaking down intracellular structures to provide energy under extreme cases of unfavorable conditions. In the process of metamorphosis of amphibians and ascidians many embryonic tissues such as gills, fins, tails etc. are digested by the lysosomes and utilized by other cells. For this action Bourne (1962) has named by lysosome as suicidal bag.

(4) Extracellular digestion :— The lysosomes of certain cells such as sperm discharge their enzymes outside the cell during the process of fertilization. The lysosomal enzymes digest the limiting membrane of the ovum for the sperm.

(5) The lysosomes are supposed to initiate the mitosis in cells.