

Kinds of lysosomes & 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.

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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 latter. Hence these are also known as hetero-phagosomes or digested vacuoles.

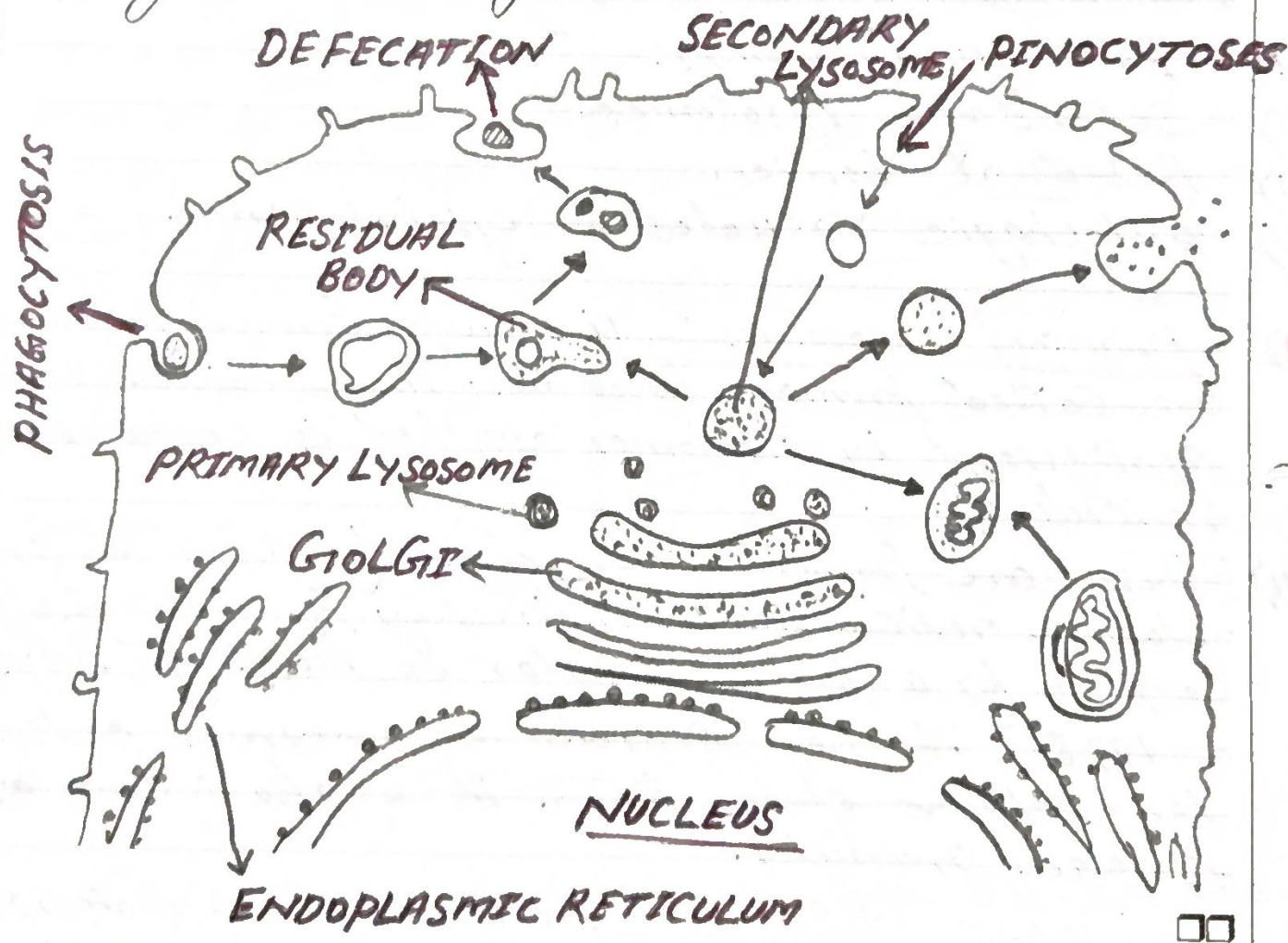


Fig:- Stages of Formation of Lysosomes.

- (iii) Residual bodies:— (i) In spite 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 residual 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 cytolysosomes. 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 serve 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 found 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 lysosomes digest the fluid substances & solid particles brought into the cell by pinocytosis and phagocytosis 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 proteins, 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. □□