

Faculty Name: Dr. Kumari Sushma Saroj

Department: Zoology

College: Dr. L. K. V. D College, Tajpur, Samastipur

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Topic: Microbodies

Microbodies

A microbody is a type of organelle that is found in both plant and animal cells. The organelles in the microbody family include peroxisomes, glyoxysomes, glycosomes, and hydrogenosomes.

In vertebrates, microbodies are especially prevalent in the liver and kidney organs.

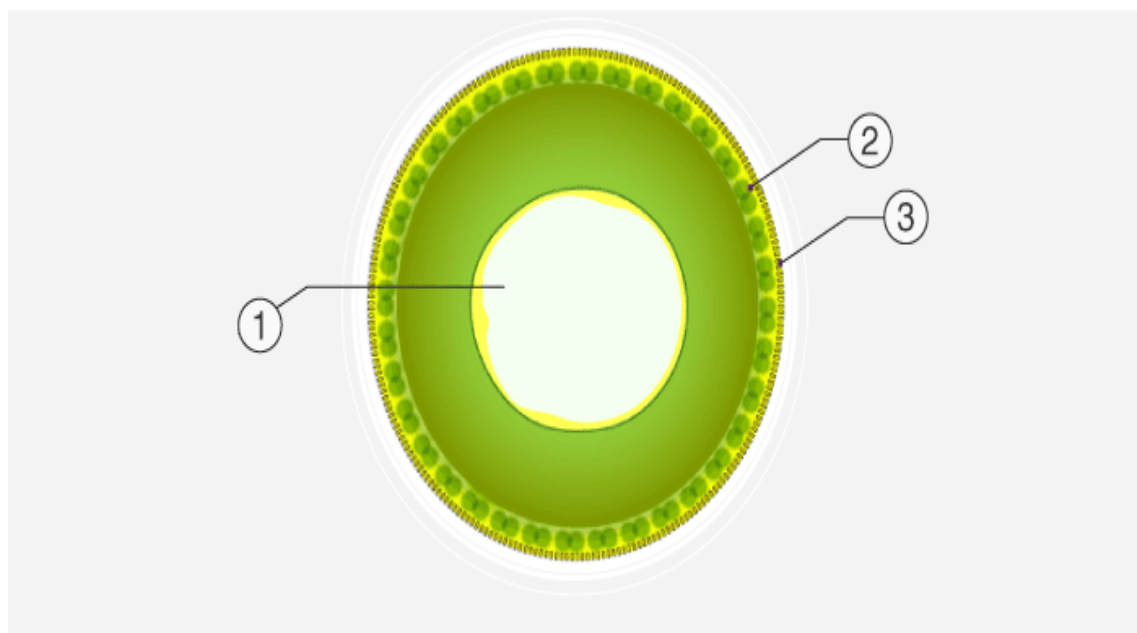


Fig: Microbody structure

1. Crystalline core
2. Lipid layer
3. Plasma membrane

Structure:

A microbody is usually a vesicle with a spherical shape, ranging from 0.2-1.5 micrometres in diameter. The microbodies are found in the cytoplasm of a cell, but they are only visible with the help of an electron microscope.

They are surrounded by a single phospholipid bilayer membrane and they contain a matrix of intracellular material including enzymes and other proteins, but they do not seem to contain any genetic material to allow them to self-replicate.

Microbodies are small single membrane-bound organelle. They are formed by ER. They were first observed by Rhodin.

Microbodies are four types:

1. Peroxisomes:

Peroxisomes help in detoxifying the alcohol in the liver cell, Contains amino acid oxidase, hydroxyl acid oxidase, peroxidase, catalase enzymes. Their catalase enzymes degrade H_2O_2 .

In animal cells peroxisomes they perform fat metabolism, peroxide metabolism.

In plant cells, photorespiration occurs in peroxisome with mitochondria and chloroplast.

2. Glyoxysomes:

These were first seen by Harry Beaver. Found in fungi and germination oil seed e.g., castor seed, groundnut seed etc.

These are involved converting fat into carbohydrates by process gluconeogenesis. In Glyoxysomes the fatty acids are oxidized to acetyl Co-A by peroxisomal β – oxidation enzymes.

Glyoxylate cycle occurs in Glyoxysomes. Groundnut sees become sweet due to glyoxylic acid.

3.Spherosomes:

These are a single membrane, small, spherical cell organelles that are specialized to synthesize and store lipids example- Cell of cotyledons mustard, groundnut etc. found in fat storing plant cells but are abundant in oilseeds e.g. maize root tip, tobacco endosperm.

They are known as plant lysosome and are also called Oleosome. Their diameter is about 0.5-2.5 micron.

4. Lomesome:

Discovered by Moor and McAlear. Found between the cell wall and plasma membrane of fungal and plant cell.

They are also known as a Paramural body, plasmalemmasomes if associated with plasma membrane.

Function:

Microbodies contain enzymes that participate in the preparatory or intermediate stages of biochemical reactions within the cell.

This facilitates the breakdown of fats, alcohols and amino acids. Generally, micro bodies are involved in detoxification of peroxides and in photorespiration in plants.

A **peroxisome** is a type of microbody that functions to help the body break down large molecules and detoxify hazardous substances.

It contains enzymes like oxidase, react hydrogen peroxide as a byproduct of its enzymatic reactions. Within the peroxisome, hydrogen peroxide can then be converted to water by enzymes like catalase and peroxidase.

Glyoxysomes are specialized peroxisomes found in plants and mold, which help to convert stored lipids into carbohydrates so they can be used for plant growth.

In glyoxysomes the fatty acids are hydrolyzed to acetyl-CoA by peroxisomal β -oxidation enzymes. Besides peroxisomal functions, glyoxysomes also possess the key enzymes of the Glyoxylate cycle.