

Difference Between Food Vacuole and Contractile Vacuole

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Key Difference - Food Vacuole vs Contractile Vacuole

Protozoa are single-celled eukaryotic organisms. They include many species such as *Euglena*, *Paramecium*, *Amoeba* etc. They are widely found in aquatic environments and perform a variety of functions in terms of environmental biology and marine biology. Protozoa, being eukaryotic are composed of different organelles, out of which vacuoles play a major functional role in their survival. Vacuoles of protozoa or generally, vacuoles in microbes can be mainly divided into two main types such as the food vacuole and the contractile vacuole. Food vacuoles in protozoa are vacuoles with a digestive function. The food vacuoles fuse with lysosomes to participate in digestion. Contractile vacuoles in protozoa functions in osmoregulation of the single-celled protozoa. They are involved in controlling the osmotic pressure within the cell. The **key difference** between the food vacuoles and the contractile vacuoles is based on its function. **The food vacuoles are involved in digestion whereas contractile vacuoles are involved in osmoregulation.**

What is a Food Vacuole?

Food vacuoles are small sacs that are distributed in the cell cytoplasm of protists, plant, fungi and in some animals. They are the main organelles involved in fulfilling the function of digestion together with lysosomes. Food vacuoles are membrane-bound organelles and the formation of food vacuoles take place when food and the cell are in close proximity.

The cell membrane of the protists has the ability to recognize the food particles. Once they recognize the food particles, they are taken into the cell via endocytosis. The cell membrane is invaginated inwards when the food is in contact with the cell membrane and they form a sac-like structure. Once the food particle is trapped inside the sac, the plasma membrane is pinched off to form a vacuole or a vesicle which is termed as the 'food vacuole'.

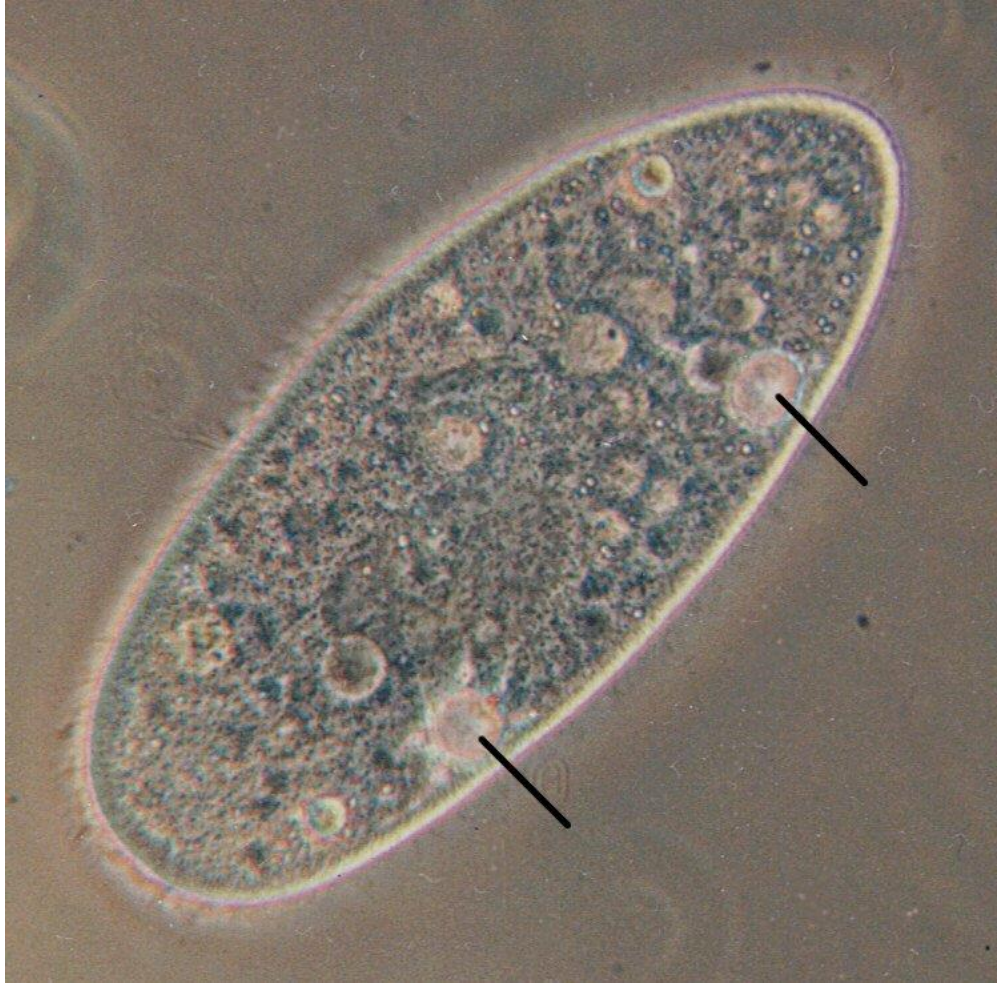


Figure 01: Food Vacuoles in Paramecium

Food vacuoles are mostly oval in shape and are distributed throughout the cytoplasm. The food vacuoles are distributed in close proximity to lysosomes as they work closely in facilitating the process of digestion. Lysosomes are membranous organelles composed of digestive, hydrolytic [enzymes](#) which include maltases, sucrases, [lipases](#), and nucleases. These enzymes are involved in digesting the macromolecules. Upon formation of the food vacuole, the food vacuole is associated with the lysosome and together they perform the process of digestion. The lysosomes invade the food vacuoles via [phagocytosis](#) to digest the contents taken up. The digested products are then released to the cytoplasm where they are involved in carrying out their respective biological functions

What is a Contractile Vacuole?

Contractile vacuoles are present mostly in aquatic protozoa. They are involved in osmoregulation in the cell. They participate in eliminating water from the cell through the process of [osmosis](#). The mechanism of action of the contractile vacuole can be explained in the osmoregulation process

of *Paramecium*. *Paramecium* contains two contractile vacuoles, where one is placed in the anterior part of the cell and the other is placed in the posterior part of the cell.

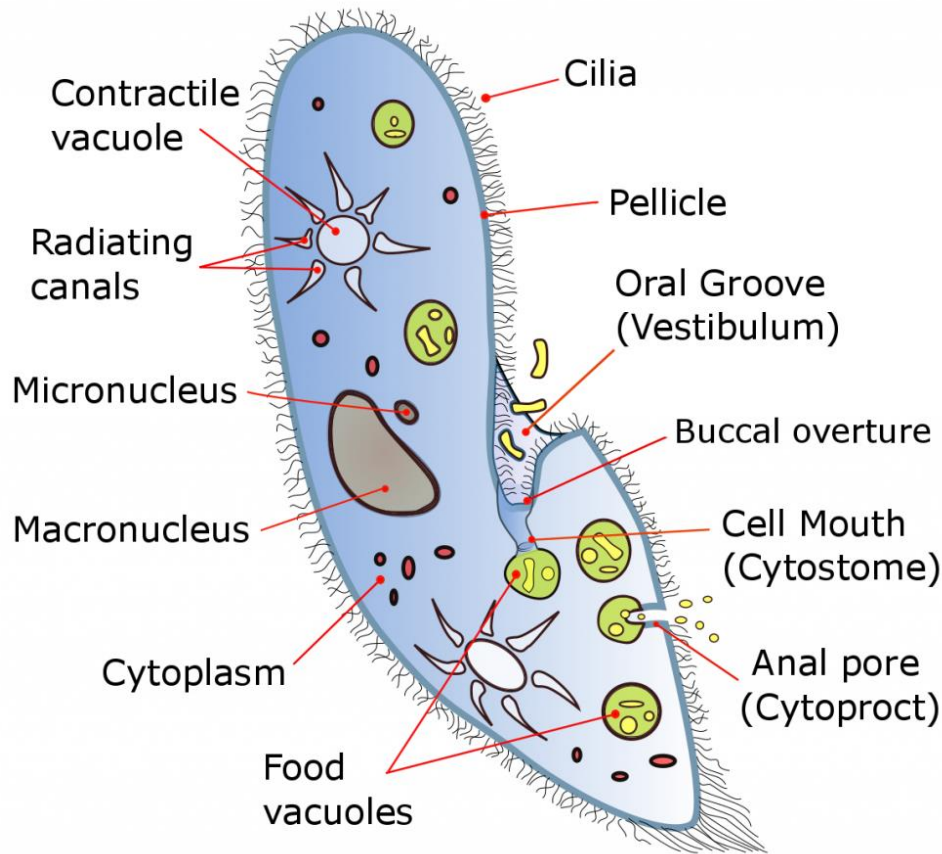


Figure 02: Contractile Vacuoles of Paramecium

Paramecium is a freshwater protozoan and therefore, it faces the problem of water entering the cell. Entry of too much water into the cell could result in the explosion of the cell. In order to prevent this, the contractile vacuoles, present in the cell cytoplasm contract and expand at regular intervals to push the water out of the cell. The contractile vacuoles direct the excess water to the [endoplasmic reticulum](#) which then directs excretion of the excess water via the nephridia.

What are the Similarities Between Food Vacuole and Contractile Vacuole?

- Both are found in protozoa.
- Both are situated in the cell cytoplasm.
- Both are membrane-bound organelles.

What is the Difference Between Food Vacuole and Contractile Vacuole?

Food Vacuole vs Contractile Vacuole	
Food vacuoles are membranous structures that participate in the process of digestion.	Contractile vacuoles are membranous structures which participate in osmoregulation of the cell and prevent the bursting of cells.
Mechanism of Formation	
Endocytosis is the method which forms food vacuoles.	Contraction and relaxation of the vacuole to push water out of the cell via the nephridia is the method which forms contractile vacuoles.
Main Function	
Digestion is the main function of food vacuoles.	Osmoregulation is the main function of contractile vacuoles.

Summary - Food Vacuole vs Contractile Vacuole

Food vacuoles and Contractile vacuoles are found in eukaryotic cells especially in protozoa. They are different in the function they perform but are vital for the survival of the organism. The food vacuoles are involved in the digestion of food along with lysosomes. Contractile vacuoles are mainly involved in maintaining the water content in the cell thereby ensuring that the osmotic pressure is balanced within the cell. The proper functioning of the contractile vacuoles prevent the cell from bursting that results from the excess entry of water. This is the difference between food vacuoles and contractile vacuoles.

Reference:

- 1.“Contractile Vacuole: Definition and Function.” Study.com, Study.com. [Available here](#)
- 2.“Food Vacuole: Definition and Function.” Study.com, Study.com. [Available here](#)
- 3.“Protozoa.” Biology Reference. [Available here](#)

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- 2.'Paramecium diagram' By Deuterostome - Own work, [\(CC BY-SA 4.0\)](#) via [Commons Wikimedia](#)

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