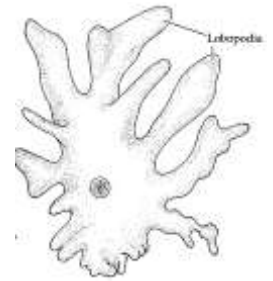


## Protozoa

The word protozoa means "little animal." They are so named because many species behave like tiny animals. They hunt other microbes as food. If you take a drop of pond water and observe it under the microscope, you can often see tiny little organisms swimming around. In fact, Anton van Leeuwenhoek, one of the first scientists to observe these creatures under the microscope gave them the name "animalcules", as if they were a combination of animals and molecules. They are **single-celled organisms** living mostly in the water.



### Nutrition

All protozoa are **heterotrophs**. They mainly feed on bacteria, but they also eat other protozoa and sometimes fungi. Some protozoa absorb food through their cell tissues. Others surround food and engulf it. Others have openings called mouth pores into which they sweep food. All protozoa digest their food in stomach-like compartments. They store the energy in molecules of glycogen, starch or lipids. As they digest, they make and give off nitrogen, which is an element that plants and other higher creatures can use.

### Locomotion

To hunt, protozoa have to be able to move about. Amoebas move about by extending parts of their cells called **pseudopodia**. They have fluid cell membranes that they can stretch out, bend and curve. As the membrane moves outward, the fluid and other parts inside the cell follow, flowing into the new bulge created by the moving membrane. Many Ciliates swim along by beating their **cilia** in a rhythmic pattern, like so many tiny oars. Flagellates swim by waving their **flagella**, using them much like a fish uses its tail to push itself through water.

### Breathing

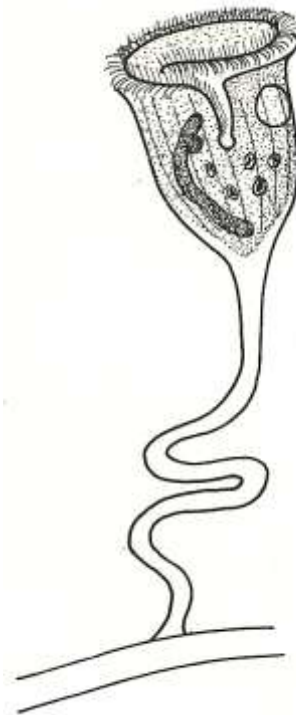
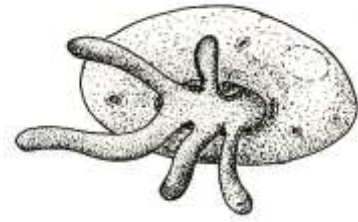
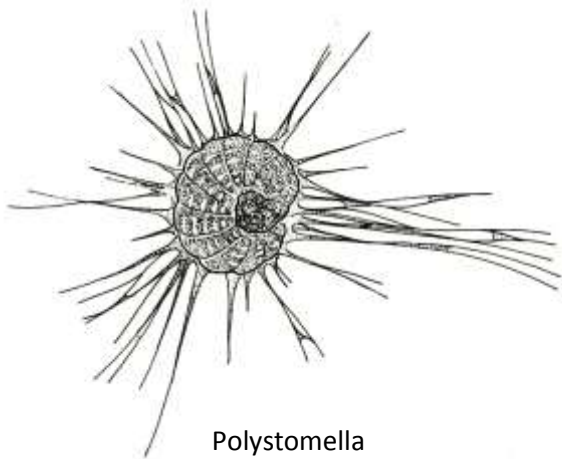
Because protozoa are so small, the surface area of their cell membrane is very large compared with the small volume of their cytoplasm. The demands of the respiratory processes in the cytoplasm can therefore be met by the **diffusion** of oxygen and carbon dioxide between the cytoplasm and the surrounding water. Oxygen diffuses in and carbon dioxide diffuses out.

### Classification of Protozoa

Protozoa vary in size from 1/5,000 to 1/50 of mm in diameter. They can be classified into four general groups based on their shape and locomotion. One group is the **Ciliates**, which are generally the largest protozoa. They have hair-like projections called cilia and they eat the other two types of protozoa as well as bacteria. The second group is the **Amoebae**. The third group is the **Flagellates**, which are usually the smallest of the protozoa and have one or several long, whip-like projections called flagella extending from their cells. The last group **Sporozoan** is the only group where the organism cannot move.

Type of Protozoa	How It Moves	Example (Genus)
Amoeboid		
Ciliate		
Flagellate		
Sporozoan		

## Examples of Protozoa



Multicellular animals carry out their living processes by means of specialised organs and tissues; the digestive system, nervous system, muscular system etc. The cells in these organs are specialised for a particular function. Muscle cells can contract, nerve cells conduct impulses, gland cells secrete enzymes or hormones. These specialised cells cannot survive on their own. They need other cells or systems to supply them with food and oxygen and to remove their waste products.

The single-celled animals can carry out all these vital functions. They grow, feed, breathe, reproduce, excrete all within the cell though certain parts of the cytoplasm may be specialised to carry out special functions; the contractile vacuole for example.