

Euglena Fact Sheet



Euglena is a genus of unicellular flagellate Protists. It is the best known and most widely studied member of the phylum Euglenozoa (also known as Euglenophyta), a diverse group containing some 44 genera and at least 800 species. A unicellular organism, also known as a single-celled organism is an organism that consists of only one cell, in contrast to a multicellular organism that consists of multiple cells. Flagellates are organisms with one or more whip-like organelles called flagella. The word flagellate describes a particular construction of eukaryotic organism and its means of motion.

Protists are a diverse group of eukaryotic microorganisms. Protista includes mostly unicellular organisms that do not fit into the other kingdoms; it is "better regarded as a loose grouping of 30 or 40 disparate phyla with diverse combinations of trophic modes, mechanisms of motility, cell coverings and life cycles." The protists do not have much in common besides a relatively simple organization—either they are unicellular, or they are multicellular without specialized tissues. This simple cellular organization distinguishes the protists from other eukaryotes, such as fungi, animals and plants.

Species of Euglena are found in fresh and salt waters. They are often abundant in quiet, inland waters, where they may bloom in numbers sufficient to color the surface of ponds and ditches green (*E. viridis*) or red (*E. sanguinea*). The species *Euglena gracilis* has been used extensively in the laboratory as a model organism.

Most species of Euglena have photosynthesizing chloroplasts within the body of the cell, which enable them to feed by autotrophy, the ability to be self-sustained by producing food from inorganic compounds like plants. However, they can also take nourishment heterotrophically, the inability of an organism to produce its own food, like animals. Since Euglena possesses features of both animals and plants, early taxonomists, working within the two-kingdom system of biological classification, found it a difficult organism to classify.

When feeding as a heterotroph, the Euglena surrounds a particle of food and consumes it by phagocytosis, the cellular process of engulfing solid particles by surrounding them within the cell membrane an internal phagosome used by phagocytes and protists. When there is sufficient sunlight for it to feed by phototrophy, it uses chloroplasts containing the pigments *Chlorophyll a* and *Chlorophyll b* to produce sugars by photosynthesis. Euglena's chloroplasts are surrounded by three membranes, while those of plants and the green algae have only two membranes.

Euglenas possess a red eyespot, an organelle composed of carotenoid pigment granules. The red spot itself is not thought to be photosensitive. Rather, it filters the sunlight that falls on a light-detecting structure at the base of the flagellum (a swelling, known as the paraflagellar body), allowing only certain wavelengths of light to reach it. As the cell rotates with respect to the light source, the eyespot partially blocks the source, permitting the Euglena to find the light and move toward it (a process known as phototaxis).

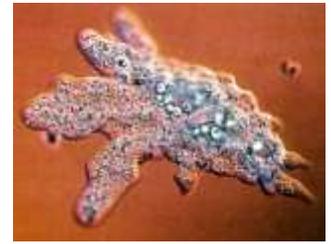
Euglena lacks a cell wall (an outer membrane containing cellulose). Instead, it has a pellicle made up of a protein layer supported by a substructure of microtubules, arranged in strips spiraling around the cell. The action of these pellicle strips sliding over one another gives Euglena its exceptional flexibility and contractility. In low moisture conditions, or when food is scarce, Euglena forms a protective wall around itself and lies dormant as a resting cyst until environmental conditions improve.

Species of Euglena were among the first protists to be seen under the microscope.

From Wikipedia, the free encyclopedia (<http://en.wikipedia.org/wiki/Euglena>)



Amoeba Fact Sheet



A microscopic unicellular organism which belongs to the Amebozoa kingdom, 'amoeba', was discovered in 1757 by August Johann Rosel von Rosenhof from Germany. Naturalists of earlier times named the amoeba after the Greek god, Proteus who was capable of changing his shape. The word 'amibe', which means 'change' in Greek was used to denote the amoeba by Bory de Saint-Vincent. One can say that amoebas are omnipresent because they thrive in soil, water and in body parts of animals.

Amoeba doesn't have a fixed body-shape and it appears similar to blobs of jelly-like substance. By constantly changing its shape, the amoeba creates body extensions known as pseudopods - which assist in locomotion. The amoeba can also gather food with the help of these pseudopods. The process through which food is consumed by amoeba is referred to as phagocytosis. Important body components of these unicellular organisms include the nucleus, cytoplasm and vacuole. The nucleus is discoid and granular. Its diameter ranges from 22-62 mkm. In most cases, the nucleus has a concave shape. There are many things which need to be understood about this important microbe. However, few important and established facts including the details about pathogenic nature of amoeba, digestion, locomotion and other processes are explained through the points listed below.

1. The process of breathing in amoeba takes place through cell membrane.
2. The diet of amoebas include bacteria, metazoa, protozoa, plant cells, etc.
3. Digestion of food in amoebas takes place in vacuoles.
4. Contractile vacuoles perform the task of removal/excretion of water and waste materials from the body.
5. Reproduction in amoeba is asexual in nature. Process of asexual reproduction in amoeba is known as binary fission.
6. Important marine amoebas include the Vannella and Platyamoeba. Different areas in which these amoeba are found include the fronds of seaweeds, coastal rockpools and even open spaces of sea.
7. The places rich in organic matter are known to contain high amount of amoeba.
8. The most commonly found pathogenic amoeba include Entamoeba histolytica, Acanthamoeba, Balamuthia, Naegleria fowleri and Hartmannella.
9. Some of the pathogenic bacteria use the body of amoebas to thrive and multiply.
10. The amoeba is known to have a large genome. There are 290 base pairs present in the genome of Amoeba proteus.
11. Contact with dilute or saline water creates excessive osmotic pressure and affects the amoeba. The cell of amoeba prevents salt influx when it comes in contact with saline water. This results into the cell becoming isotonic; it causes the cell to shrink further.
12. Movement of amoeba while it is in search of food is governed by chemotaxis.
13. Presence of organic content in the surroundings is favorable for the growth of amoeba. This is because, organic content helps increase the bacterial population. The amoeba thrives in areas with high bacterial population.
14. The taxon, Sarcodina is classified into Actinopoda and Rhizopoda. Amoebas grouped under Rhizopoda possess unsupported pseudopodia. Those grouped under Actinopoda have stiff pseudopodia.
15. Most species of amoeba resemble the Amoeba proteus. It is therefore, important to undertake careful study before coming to any particular conclusion about identification.

Here are few interesting facts about the amoeba.

- The Pelomyxa palustris is the largest of all amoebas found in pond water.
- The amoebas are mostly known as pathogens. However, it is interesting to know that most amoebas recovered or obtained by scientists are non-pathogenic.
- The amoeba is known to take the cyst form when it encounters potentially threatening situations. In the cyst form, the amoeba secretes the cyst membrane for protection. Also, it rolls into a ball. Amoeba returns to its original form when the situations becomes favorable.
- To prevent cannibalism, the amoeba secretes a chemical which keeps other amoebas away. This kind of chemical secretion can also protect the amoeba from predators.

The amoeba is amongst the organisms which infest almost all places of the world. Therefore, it is one of the important creatures of this planet. There is great scope to conduct research about amoeba since, very less is known about this microbe. Hopefully, we will get to know more facts and interesting information about the amoeba.

By [Shashank Nakate](#)

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Paramecium Fact Sheet

Paramecium is a group of unicellular ciliate protozoa. They belong to the kingdom protista, class ciliata and family parameciidae. Several species of genus paramecium are known and studied, for instance, aurelia, bursaria, caudatum, trichium, etc.



Though characteristics of paramecium are different from the characteristics of normal animals, it belongs to the group of living organisms and is a part of the living world. Paramecia have no eyes, no ears, no brain and no heart; but still, they undergo all life and growth processes like locomotion, digestion and reproduction and you can observe all these processes under a microscope.

Paramecium size ranges from about 50 to 350 μm in length. The cell is covered by cilia (short, hairlike projections of the cell), which allow the cell to move with a synchronous motion (like a caterpillar). It is one of the well-studied unicellular organisms, that is found in almost all types of aquatic environment. It widely spreads in freshwater environment and is especially present in scums. Recently, some new species of Paramecia have been discovered in the oceans.

One of the interesting paramecium facts is that it has a deep oral groove from where food is drawn inside. Paramecia generally feed on bacteria, other small cells, yeast or small algae. The cilia help catch the food which is then forced down a little tube called a gullet, that leads to the protoplasm or stuffing of the cell. The food is held in little vacuoles.

A pair of contractile vacuoles pumps excess water out of the cell. Water is absorbed by osmosis from the cell's surroundings and the pair of vacuoles is responsible for the process of osmoregulation (regulation of the osmotic pressure of the fluids in an organism). Oxygen and carbon dioxide pass through the cell membrane of the paramecium cell.

The stiff outer covering of the paramecium gives it a permanent 'slipper' like shape. The exterior membrane of the cell is known as 'pellicle'. It is stiff as well as flexible. Some flexing of the surface is possible because of this membrane. The cilia help paramecia to move. They can move at speeds of approximately 2,700 $\mu\text{m}/\text{second}$ (12 body lengths per second). One of the amazing paramecium facts is that although it normally moves forward in a corkscrew manner, it is capable of reversing its direction when it encounters an adverse condition! To observe this trial-and-error behavior (backing up and then continuing forward in a slightly different direction until the correct path is found) through a microscope is a breathtaking site.

Besides having an oral groove, paramecia have an anal pore, two contractile vacuoles that regulate the water content of the cell and two nuclei. The larger nucleus called macro-nucleus plays an important role in regulating most cell functions, while the smaller nucleus, known as micro-nucleus, is responsible for paramecium reproduction.

Paramecium reproduction usually takes place asexually, by cell division; but the unicellular organism can even interchange the genetic information through a process called conjugation. Just like amoeba, the paramecium cell splits in half (fission). Initially, the smaller nucleus divides itself into two halves and each half goes to either end of the paramecium. Then the bigger nucleus divides and the whole paramecium splits.

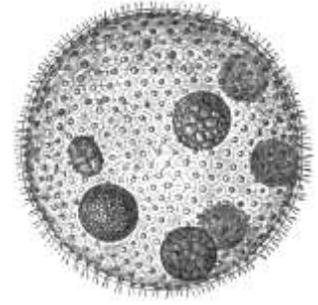
During the process of conjugation, two paramecia join at the oral grooves and interchange micro-nuclei that are in fact nothing but little packages of DNA. After the union, the cells divide, producing daughter cells with DNA from each of the parents.

Paramecium facts inform us that though paramecium is an unicellular organism, the cell contains everything needed for survival. Most paramecia are microscopic and over 80,000 different species of paramecia have been so far identified. Though they can be seen with naked eyes, microscope is required to study the structure and behavior of paramecia. I hope you found the above facts interesting.

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Volvox Fact Sheet



The volvox is a type of green algae/chlorophyte. Amongst the genera of green algae that form spherical colonies, volvox are the most developed. The colonies of volvox contain flagellate cells that can be 50000 in number and embedded in coenobium or hollow muscilagenous spheres. These hollow spheres are formed of extracellular matrix which contains gelatinous glycoprotein. The cytoplasmic strands of volvox which connect the cells together make them greenish in color. The volvox are found in freshwater. Ditches, ponds and shallow puddles are places where these organisms thrive well. The different volvox characteristics and interesting volvox facts makes this organism a model for studying fundamental questions pertaining to development. Let us delve into different volvox facts through the information presented in this write-up.

The different characteristics of volvox are enlisted below.

- The volvox grows well in eutrophic water bodies. Such eutrophic lakes that are rich in nutrients allow a prolific and healthy growth of volvox.
- Every single ovoid or spherical cell in the volvox colonies possess two flagella. A pair of contractile vacuoles along with single, cup-shaped chloroplasts are present at the base of these flagella.
- The cells of volvox can be single or biflagellate.
- Individual algal cells of volvox are attached with each other by means of cytoplasmic strands. These individual cells of algae are characterized by the presence of red eye spots on their surface.
- Flagellar movement of cells present in volvox colonies are used for swimming (rolling motion) and also in changing the direction.
- The musilage produced by every individual cell in the colony can be distinct or inconspicuous.
- In a particular colony of volvox, cells at the anterior possess phototactic abilities; the phototactic abilities of these anterior cells are attributed to larger eyespots.
- Posterior cells of the volvox colonies are more into functions like reproduction.
- The volvox is a polyphyletic organism; which means that it has multiple ancestral lineages. Different species of volvox have evolved basically from ancestral lineages that are four in number.
- The size of volvox colonies ranges from 100-6000 microns.
- Most of the volvox species are microscopic organisms and therefore, we cannot see them with naked eyes. However, few colonies are as big as 1 mm in diameter.
- In the different stages of development of volvox, one can get to see their daughter cells and in few cases, even grand-daughter cells.
- One can find parasites feeding on cells of volvox in some colonies. A rotifer called *Proales parasita* thrives by feeding on cells of volvox.

The volvox characteristics is that it regenerates both by sexual and asexual reproduction. The asexual cells, gonidia, present at the posterior of volvox colonies contribute in asexual reproduction through repeated division. Growth of the gonads (daughter cells) takes place from cells that are present around the equator of volvox colonies. The somatic/vegetative cells do not divide and therefore are unable to take part in reproduction. Sexual reproduction takes place by the fusion of sperms and egg cells. It is necessary to note that volvox can be monoecious or dioecious. The fertilization of male and female gametes in sexual reproduction leads to the formation of zygotes. The species called *Volvox aureus* has a smooth surface. *Volvox globator* on the other hand, has zygotes that are star-shaped.

The different volvox characteristics presented in the article should help in understanding more about these wonderful aquatic creatures. Their highly organized structure and way of functioning makes volvox an interesting topic of study.

By [Shashank Nakate](#)

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