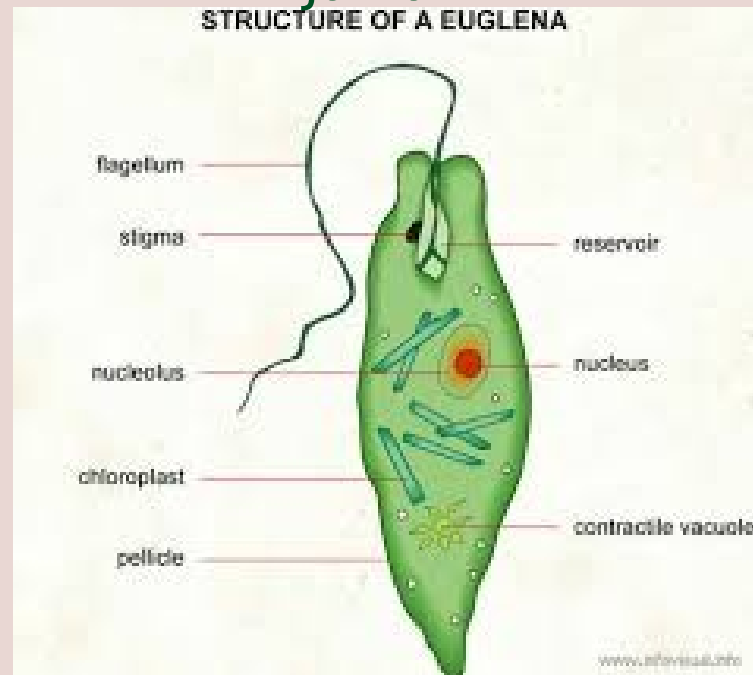
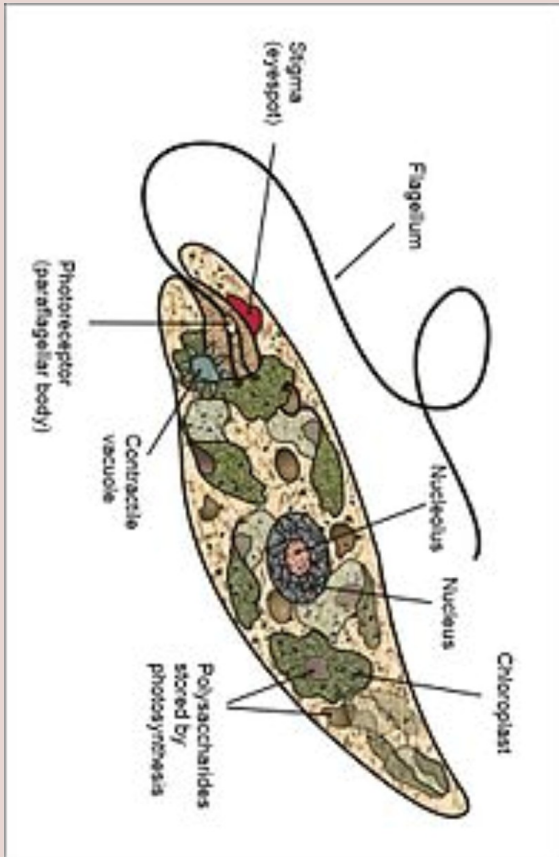




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Phylum – Protozoa

SubPhylum – Sarcomastigophora

Superclass- Mastigophora

Class – Phytomastigophorea

Order – Euglenida

Genus – *Egulina*

Spp - *viridis*

Euglena

- Euglena is a genus of microscopic, **one-celled organisms**.
- They are Solitary , **fresh water**, and are especially common in warm seasons when they may form a **green scum** on the surfaces of small ponds or drainage ditches.
-
- Euglena are interesting because they are a sort of **combination of plant and animal**.
- **They can make their own food like a plant, but they can also eat other things, like an animal. They can also swim and move.**

- 60 micron
- Elongated and spindle shaped
- Body covered by pellicle lies beneath the plasma membrane
- Helically disposed strips
- Articulating edge appearing myonemes
- Cytoplasm
 - Ectoplasm
 - Endoplasm
 - Reservoir
 - Flagellum
 - Axial elastic axoneme
 - Kinetoplast

- Contractile apparatus
- Stigma
- Endoplasmic inclusion

Euglena

Habitat

- Euglena are commonly found in freshwater streams and ponds and make excellent specimens for study. They reproduce rapidly and can be studied under an ordinary microscope.



Euglena

Survival

- This is the palmelloid stage of development where the **Euglena** rounds up into a ball discarding its flagellum.
- They will stay in this stage until their environment improves.
- Note the red eye spot on the far left specimen.



Euglena



- This photograph shows how easily the Euglena can alter its shape when it meets an obstacle.

Euglena

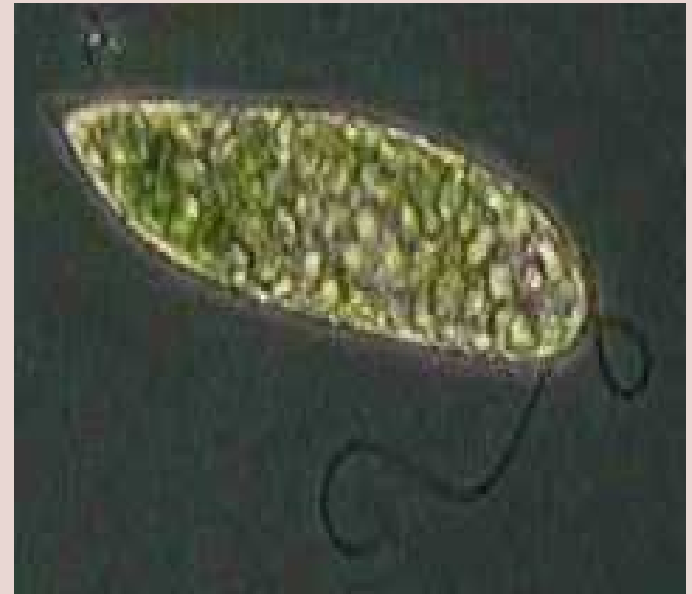
Relationship to Humans

- Euglena are harmless to people but they are often signs that **water is polluted**, since they do well where there is a lot of **green algae to eat**.
- **Green algae** does well where there is **a lot of nitrogen** (comes from waste) in the water.
- If you don't clean your swimming pool, leaves and twigs get in the water and turn into waste. Then algae and euglena show up.

Euglena

Locomotion

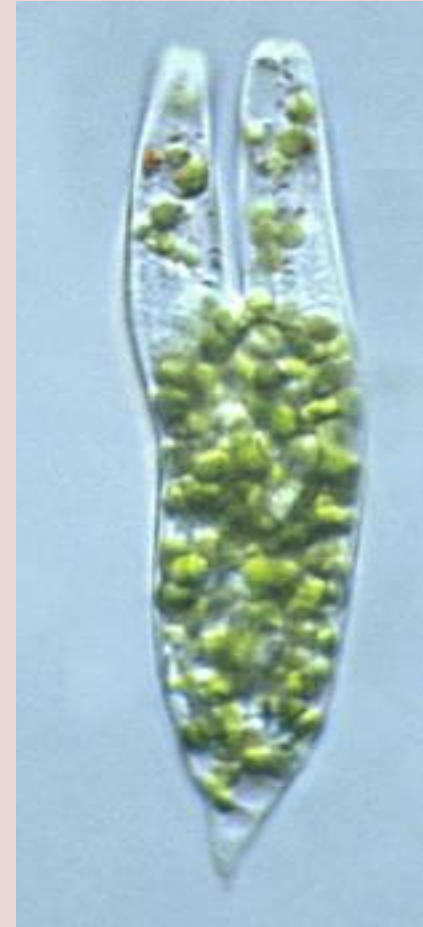
- Euglenas use a flagellum (a whip-like appendage) that sticks out from the body, to move and are thus categorized as flagellates.
- Contrary to what you might think, the **flagellum pulls** the *Euglena* through the water, somewhat like the propeller of an airplane pulls it through the air.



Euglena

Reproduction

- This photograph shows the **Euglena** dividing into two separate organisms by splitting down the middle.
- **Binary fission** usually begins with the onset of night fall with the large flagellum being shed first.
- The **nucleus, chloroplast and basal bodies** all divide so each new cell ends up with the required cell components.
- This procedure takes quite a long time and requires plenty of spare time to follow all the way through.



Reproduction in *Euglena*

In *E. viridis* no sexual reproduction occurs. It reproduces by asexual binary and multiple fissions and undergoes encystment. Under favorable conditions euglenas reproduce by longitudinal binary fission. The longitudinal binary fission is always symmetrogenic, that is, the parental *Euglena* divides into two daughter individuals, where one is the plane mirror image of the other.

A. Binary Fission:

The nucleus divides into two mitotically followed by division of cytoplasm. In prophase stage all the nuclei (endosomes) fuse together and each chromosome splits into two daughter chromosomes or chromatids. In metaphase all the chromatids are arranged in the equator. No spindle is formed at the anaphase, but the chromatids are separated and moved towards the opposite poles. In telophase due to the constriction of the nuclear membrane the nucleus is finally separated into two daughter nuclei. Following the nuclear division all the anterior extra-nuclear organelles such as the blepharoplasts, reservoir, cytopharynx and stigma, etc. are all duplicated.

The division of nucleus (karyokinesis) is immediately followed by division of cytoplasm (cytokinesis) where due to the longitudinal splitting of the cytoplasm the Euglena divides into two daughter euglenae.

In some cases the stigma breaks into component granules. Ordinarily the original flagellum of the parent is retained by one daughter euglena and the other develops a new one. On the other hand, some observers have reported complete disappearance of the entire locomotory apparatus during division, and each

B. Multiple Fission:

Cases of multiple fission, though rare, have also been reported. Multiple fission takes place in encysted condition. Euglena very readily encysts forming both thick and thin walled cysts within which it divides into several (16-32) daughter englenas. Sometimes the flagellate loses its flagellum and rounds up into an alga-like cell in which metabolisms continues and reproduction occurs by fission, thus, forming extensive green scums on the surface of ponds. In this condition, they are said to assume the Palmella state. Such a palmella stage is of regular occurrence in some species.

Encystment:

Under certain conditions ordinary protective cysts are also formed. Encystment is stimulated by lack of food, lack of oxygen, drying, heat (as in strongly illuminated cultures) and fouling of the medium. The cyst is composed of a special carbohydrate and is of yellowish brown colour. The cysts are generally rounded, their walls being made of two or three concentric layers. The cysts are usually small, their total width being equal to the diameter of the animal, it may be larger sometimes. Thin and stalked cysts have also been reported in some species and in others each may be provided with an operculum.

The cysts are protective structures that help the organisms to withstand unfavorable circumstances and also help their dispersal. On the return of favorable conditions the cysts dissolve and the organisms come out and begin normal life.

