

Chapter 9**Short Motes on: *Euglena***

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Euglena**Classification -**

Phylum - Protozoa

Subphylum - Plasmodroma

Class - Mastigphora

Order - Euglenoidina

Genus - *Euglena*

Habit and Habitat -

- *Euglena* is solitary flagellate found commonly in freshwater ponds, ditches, pods, and slow running, stream and in brakish water.

General Characteristics-

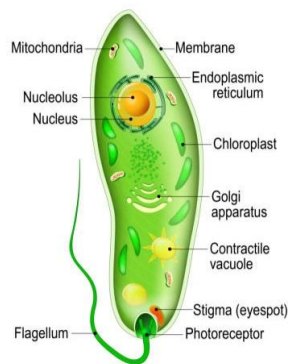
- Body of animal is simple fuse form, spindle shaped plump like red or green colour.
- *Euglena* measure 50 to 100 microns in length.
- Outer covering is called as pellicle which are marked by an spiral striations called as myonemes
- Anterior end has funneled shaped cytosome which leads into a flask – shaped cytopharynx.

- On one side is a red mass of hematochrome called stigmata which is photosensitive
- Endoplasm contains nucleus chloroplast and other ultra structural organelles
- Nutrition holophytic or saprophytic and reproduction by longitudinal division or encystment.
- *Euglena* does not take solid food but lives entirely by autotrophic and saprozoic nutrition. It
- Is unique animal with floral mode of nutrition and funnel mode of life and reproduction?
- *Euglena viridis*, *E. rubra*, *E. sanguine* and *E. fusiformis* are common spices they respond to various stimuli such as light heat etc.

Structure of *Euglena*

- It is a small microscopic, unicellular organism measuring about 40-60 μ in length and 14-20 μ in breadth at the thickest part of the body.
- It is elongated and spindle-shaped in appearance. The anterior end is blunt, the middle part is wider and the posterior part is pointed.

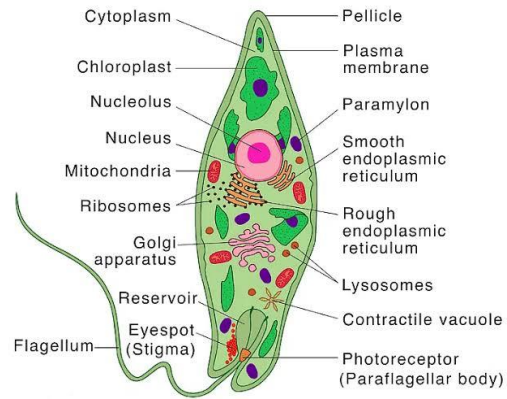
- The whip-like flagellum arises from the anterior end.
- The body is covered by distinct, thin, elastic, and tough, and strong pellicle or periplast which lies beneath the plasma membrane.
- It is made of protein, not cellulose so that it is not homologous to the plant cell wall.
- It is flexible enough to permit movements.
- It has spiral or parallel striations, called myonemes all around.



Structure of Euglena

Internal structure -

- Electron microscopy of pellicle shows that it is made of thin, firm, elastic, and helically disposed of strips.
 - This pellicular strips fuse at both the ends of the cell body and bear a groove along one edge and a ring along with the other.
 - The edges of adjacent strips overlap and articulate along their entire length in such a way that the ridge of one fits into the groove of the other.
- Under the light microscope, these articulating edges appear as striations, called myonemes. Beneath the pellicle are present rows of mucus-secreting muciferous bodies and bundles of microtubules.

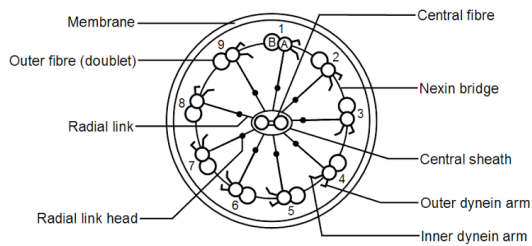


Flagellum –

- At the anterior end of the body, a single, long, thread-like flagellum arises through the cytostome.
- It is typically made of an axial elastic filament or axoneme, covered by a protoplasmic sheath.
- The length of flagellum differs in different species of Euglena but in *E. viridis* it is as long as the body of the animalcule.
- Electron microscopy has revealed that the flagellum is not just one but paired, the other being smaller and confined within the reservoir. Each flagellum originates from a tiny granule, the blepharoplasty (Gr., blepharon, eyelid + plastos, formed), or kinetosomes, located in the cytoplasm near the base of the reservoir.

The long flagellum bears a lateral swelling, the paraflagellar body near its base within the reservoir which acts as

a photoreceptor and probably contains lactoflavin as a sensitizer.



Structure of flagellum (T.S.)

- The animal moves with the help of a long flagellum only. The short flagellum does not come out of the reservoir.

Locomotion of Euglena

Euglena viridis performs 2 different kinds of movements: **(1) flagellar and (2) euglenoid.**

1. Flagellar movement-

- *Euglena* swims freely in water with the help of a single, long locomotory flagellum by whipping, twisting, and turning it around like that of a propeller.
- The locomotory flagellum is equal to the length of the Euglenoid's body and it highly helps it to swim freely in the water.
- During swimming, the flagellum is directed obliquely backward towards the side bearing the stigma.
- This flagellum undergoes spiral undulations, with waves, that are transmitted from the base to the tip, causing its beating or the sideways lashing.
- The flagellum undulates or beats on average, at the rate of about 12 beats per second.
- The beating of the flagellum creates water waves that drive the water backward and induces the body to move forward.
- Each beat not only throws the body forward but also to one side. Thus, when the beats are repeated over and over, the *Euglena* revolves in a circle or gyrates.
- As the flagellum is directed obliquely backward to the long axis of the body, the organism rotates on its axis.
- It has been calculated that *Euglena* rotates at the rate of one turn per second.
- The three different types of movement of the Euglenoid body caused by the locomotory Flagellum are forward movement, rotational movement, and revolutionary movement.
- The movement of a flagellum involves the contraction of its 9 peripheral fibers. Their position is ideal for undulating actions as they could exert bending around the flagellar axis. The energy for the contractile action of fibers is supplied by ATP (adenosine triphosphate) formed in mitochondria, which are included in the blepharoplasts.