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Division: Chlorophyta

(COMMONLY KNOWN AS GREEN ALGAE)

Lab-5

Practical Phycology

Chlorophyta: Important Features

- **Chlorophyta** are commonly known as green algae because chlorophyll α and b, α, β and carotenes and several xanthophylls are found.
- It includes about **360 genera** and more than **5800 species.**
- Members of chlorophyta are widely distributed in terrestrial and aquatic habitats (freshwater and marine).

Chlorophyta: Important Features

- Some of them are found on moist soil & walls e.g *Fritschiella*. On shells of snails e.g *Cladophora* or inside the thallus e.g. *chlorella*.
- The organization of the thallus varies widely. It sorts from unicellular, multicellular colonial, filamentous to complex thalloid forms.
- Pyrenoid is present. Pyrenoids are embedded within chloroplasts. The Pyrenoid **is the site of starch formation.**
- Reserve food is mainly in the form of starch which occurs as grains and clustered around the pyrenoids while in Siphonales, the reserve food is in the form of oil drops

Chlorophyta: Important Features

- The motile stages are present in the life cycle. Flagella are mostly of "isokontae“ the flagella are similar in length.
- Cell wall is mainly composed of cellulose. In some, pectin is also present in small quantity.
- Sexual reproduction includes isogamy, advanced oogamy, anisogamy and conjugation
- asexual reproduction includes zoospores.

The class of Chlorophyceae have divided into following orders:

Order	Family	Example
1.Volvocales	1.Chlamydomonadaceae	*Chlamydomonas* and *Carteria*
	2.Volvocaceae	*Pandorina, Eudorina, Pleodorina and Volvox.*
2.Chlorococcales	1.Chlorellaceae	*Chlorella*
	2.Hydrodictyaceae	*Hydrodictyon and Pediastrum*
	3.Coelastraceae	*Scenedesmus*
3.Ulotrichales	1.Ulotrichaceae	*Ulothrix*
	2.Ulvaceae	*Ulva and Enteromorpha*
4.Cladophorales	1.Cladophoraceae	*Cladophora and Pithophora*
5.Chaetophorales	1.Chaetophoraceae	*Chaetophora, Draparnaldia*
	2.Coleochaeceae	*Coleochaete*
6.Oedogoniales	1.Oedogoniaceae	*Oedogonium*
7.Zygnematales	1.Zygnemataceae	*Spirogyra and Zygnema*
	2.Desmidiaceae	*Cosmarium and Closterium*
8.Siphonales	1.Caulerpaceae	*Caulerpa*
	2.Codiaceae	*Codium*

Chlamydomonas: Ehrenberg, 1833

Division: Chlorophyta
Class: Chlorophyceae
Order: Volvocales
Family: Chlamydomonadaceae
Genus: *Chlamydomonas*
Common occurrence: Most of the species are fresh water. Some found in ponds, pools, and lakes. On the surface of water, mostly it forms a green layer.

A. External features

1. Thallus is unicellular and motile.
2. The cell is usually oval in shape. (Sometimes spherical, oblong, or pyriform).
3. The cell is surrounded by a cell wall. It is narrow at its anterior end and broad at the posterior end.
4. Anterior end bears two closely situated flagella similar in length isokontae and without hair on its surfase (whiplash type).
5. At the base of each flagellum, a blepharoplast or basal granule is lying.
6. At the base of each flagellum, one contractile vacuole is present.

❖Sexual reproduction is Isogamy and Asexual is Zoospores .

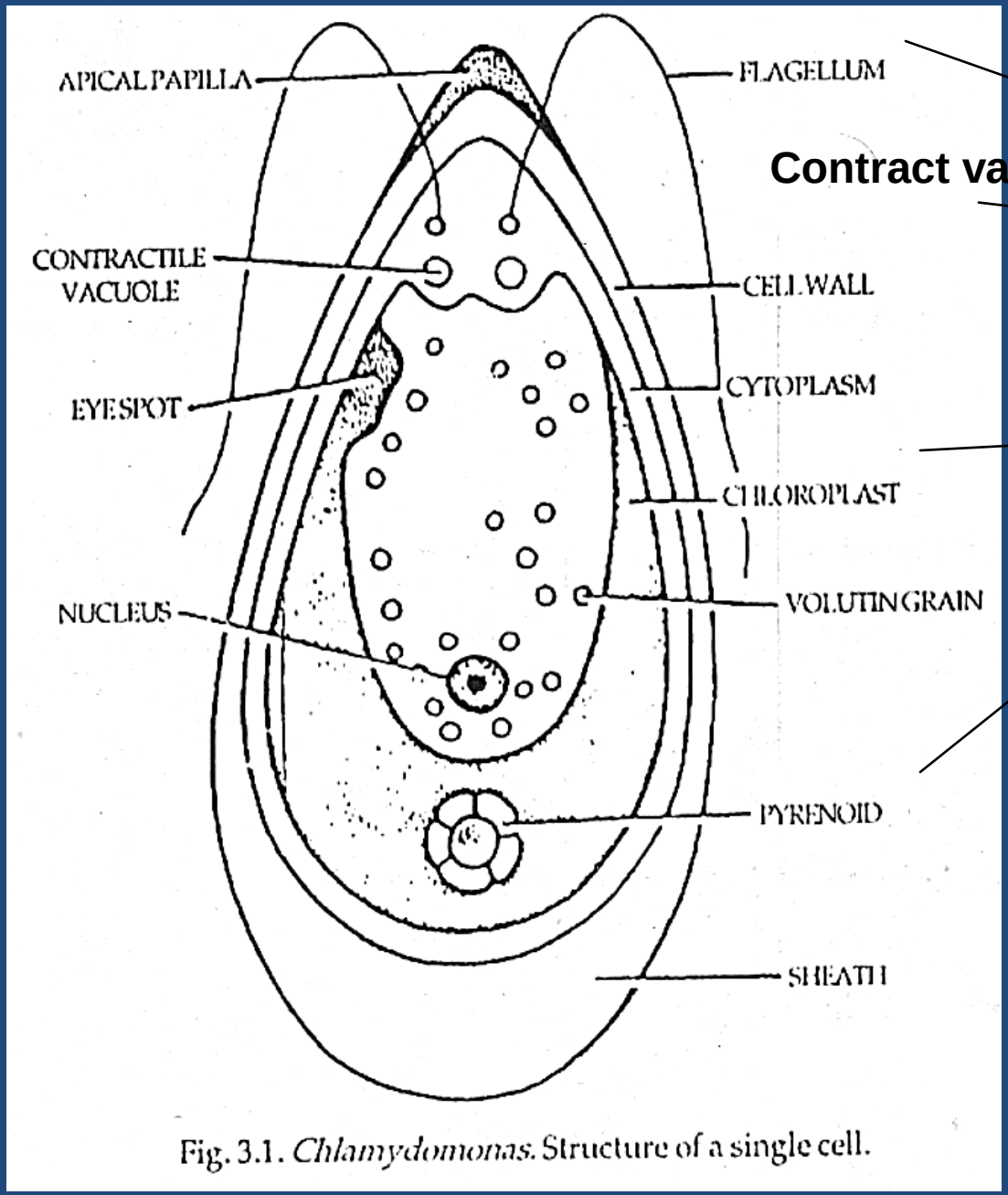
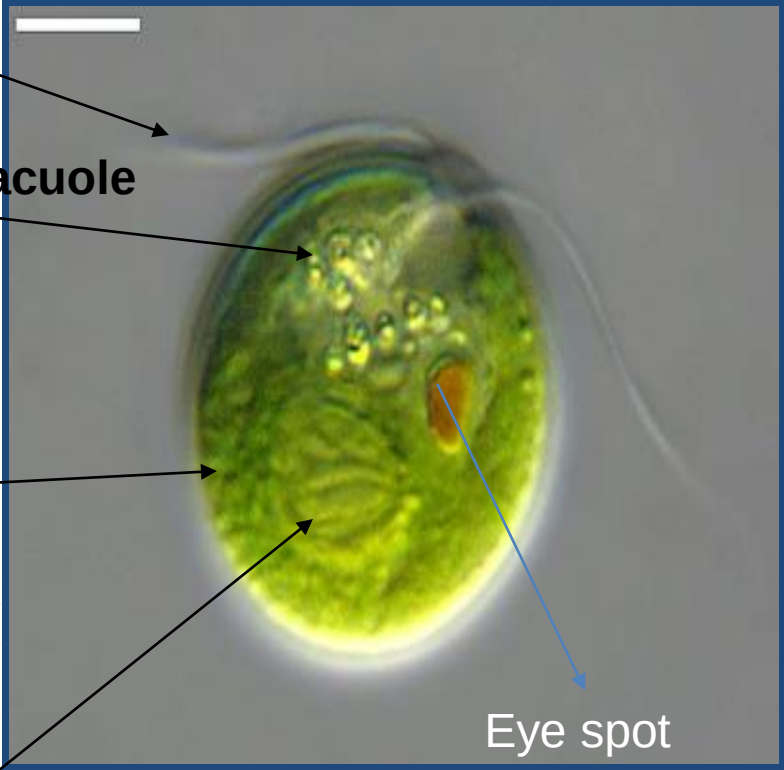


Fig. 3.1. *Chlamydomonas*. Structure of a single cell.

Contract vacuole



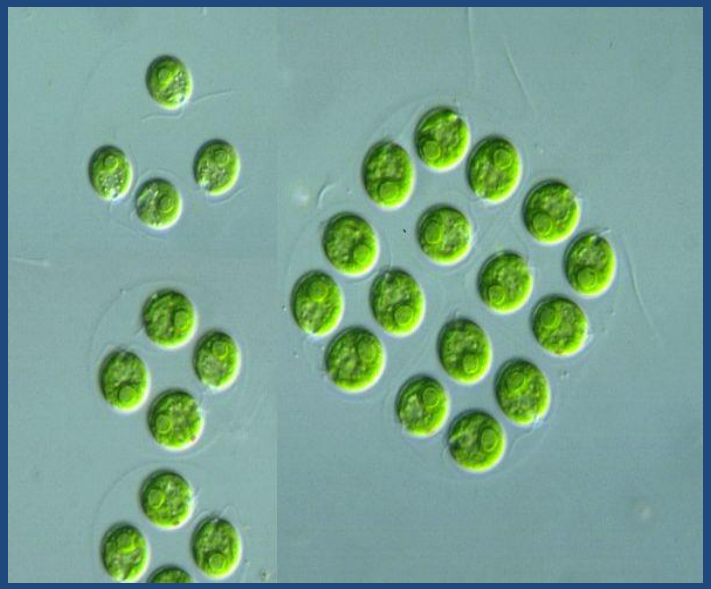
8. Just near the cell wall, towards the antero-lateral part of the cell, an orange or red colored spot is found called **stigma** or **eye spot**.
9. The posterior part has a large and a single cup-shaped chloroplast.
10. The broad portion of the chloroplast has a single pyrenoid (sometimes two to many).

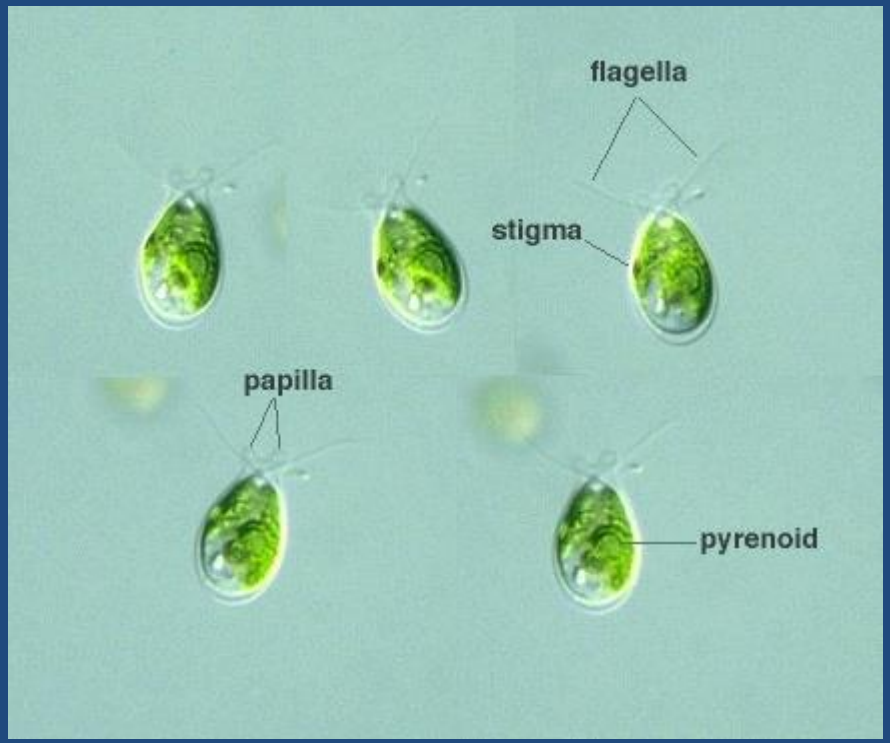
B. Neuromotor apparatus:

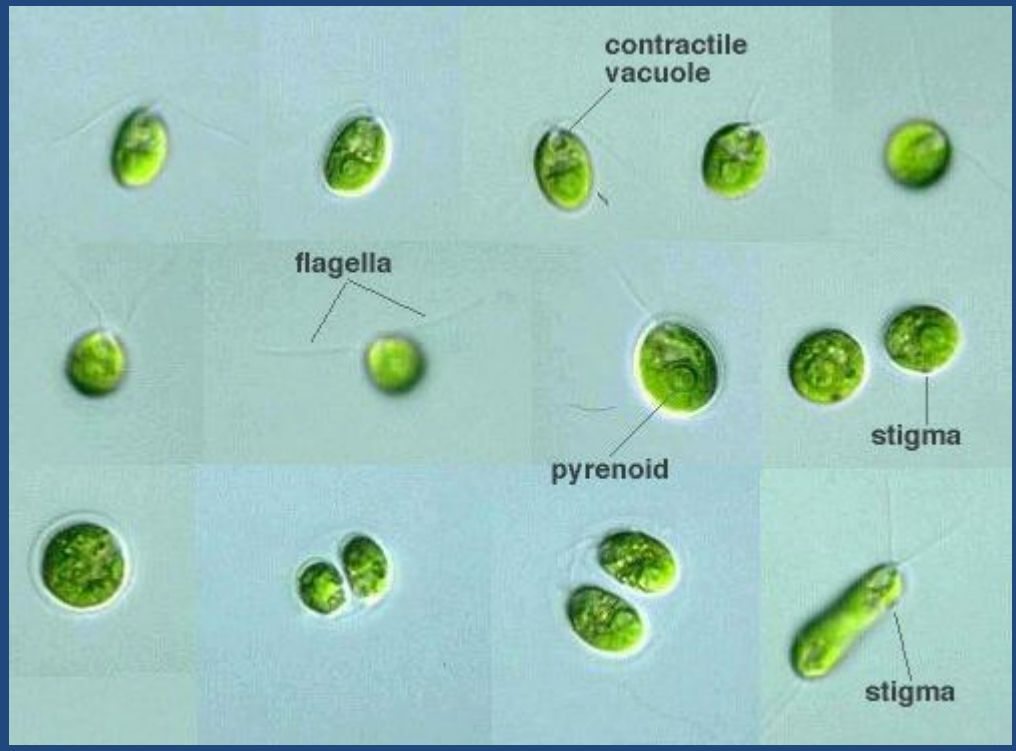
It is also known as flagellar apparatus and it consists of:

(a) Two **blepharoplasts** connected by a fibre called paradesmose.

(b) One of the **blepharoplast** is connected to the *centrosome* of the nucleus by a descending thread called **rhizoplast**.




flagella
stigma
papilla
pyrenoid


contractile vacuole
flagella
pyrenoid
stigma
stigma

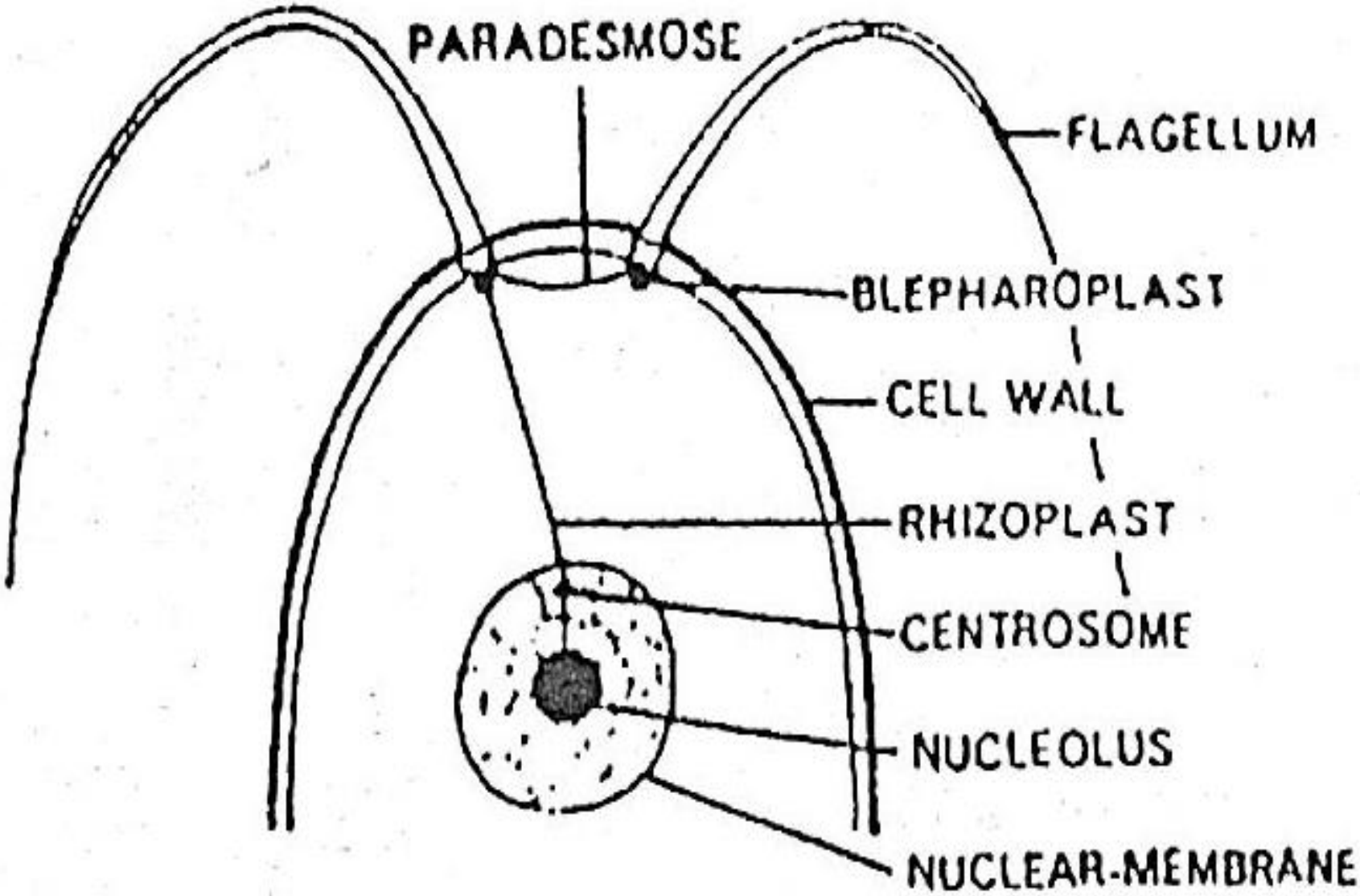
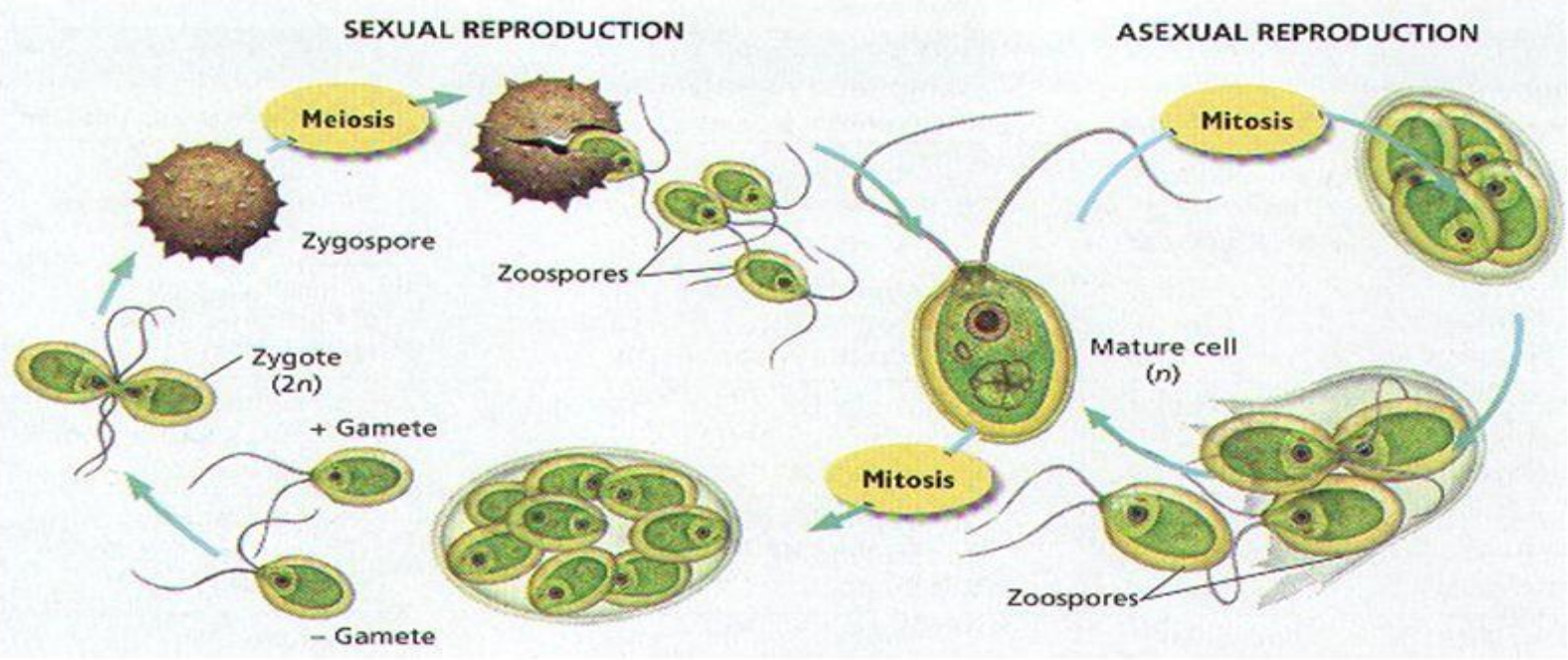


Fig. 3.2. Chlamydomonas showing neuromotor apparatus.

Chlamydomonas Life Cycle



Carteria Sp.

It is morphologically similar to *Chlamydomonus* sp.
But have four flagella

Chlamydomonas

Carteria