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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 β , α , β and γ carotenes and several xanthophylls are found. It includes about **360 genera** and more than **582 species**.
- Members of chlorophyta are widely distributed in aquatic and terrestrial habitats. Representatives of :
 - 1- **Siphonales** and **Ulvaceae** are marine,
 - 2- **Oedogoniales** and **Conjugales** are fresh water.
 - 3- **Volvocales**, **Cladophorales** and **Chaetophorales** live in sea as well as fresh water.

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

***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**.

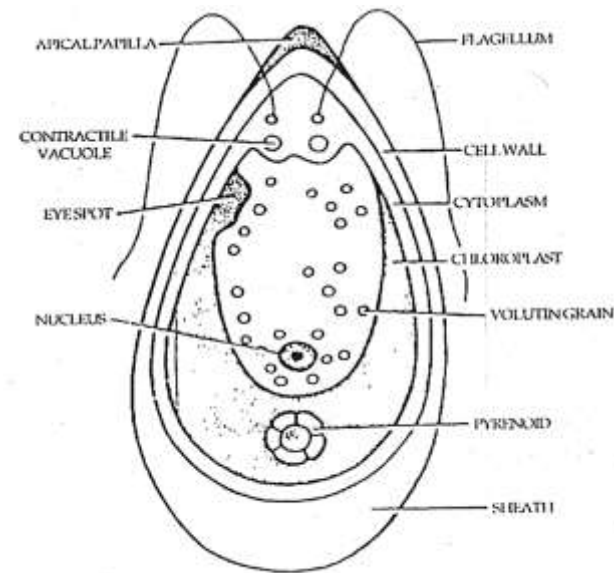


Fig. 3.1. *Chlamydomonas*. Structure of a single cell.

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** (**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**.

❖ Asexual is **Zoospores**.

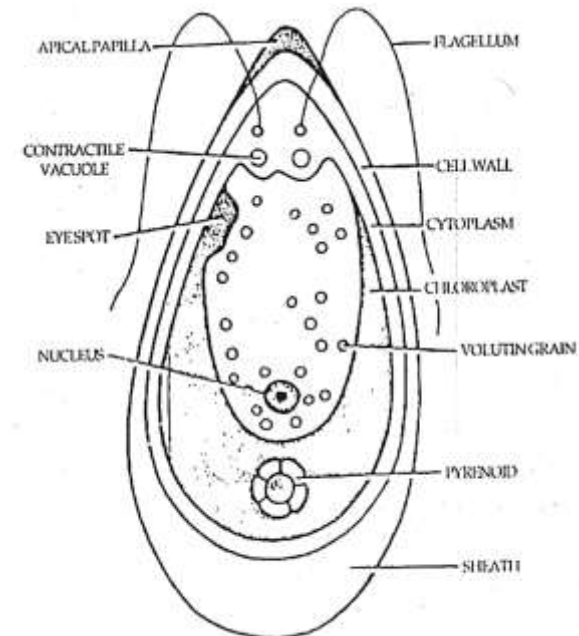
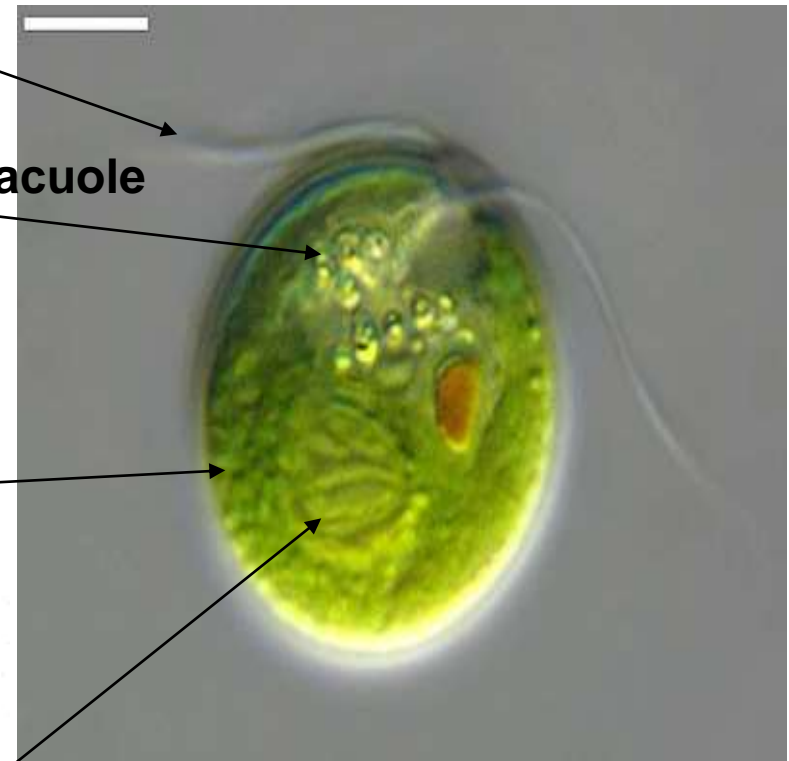
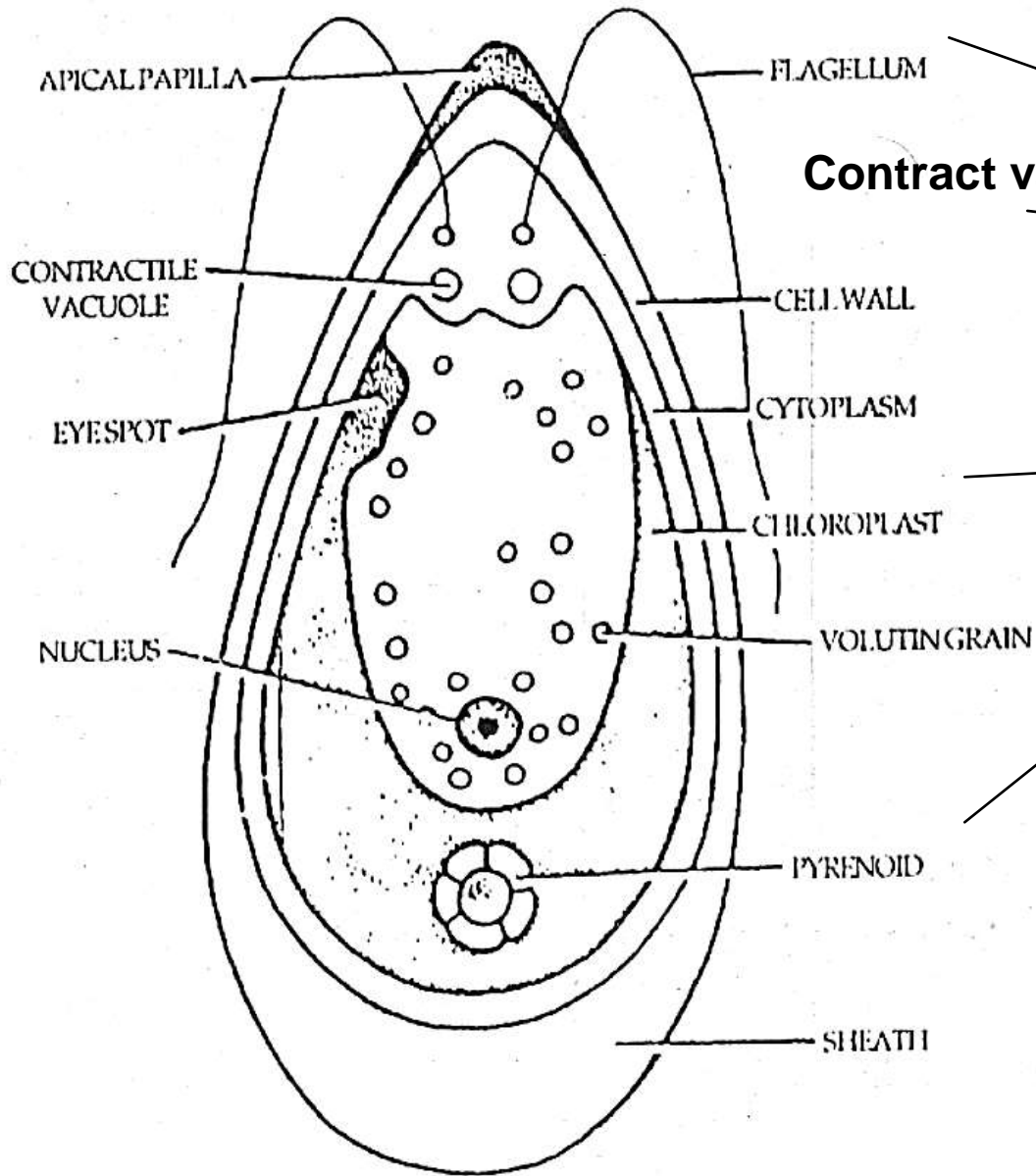
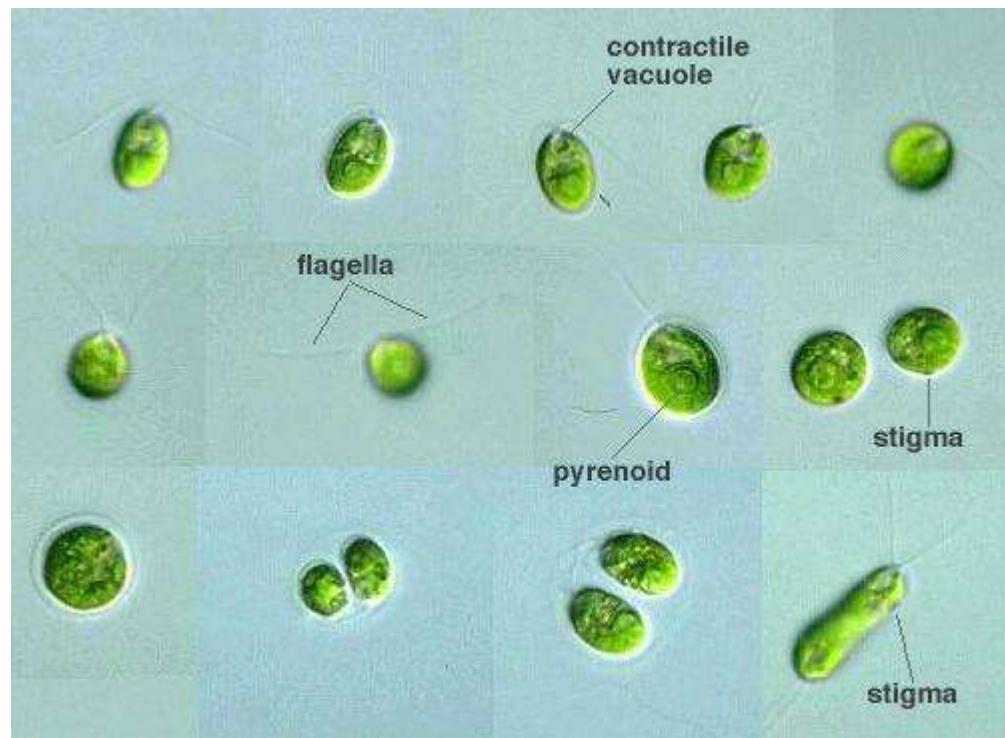
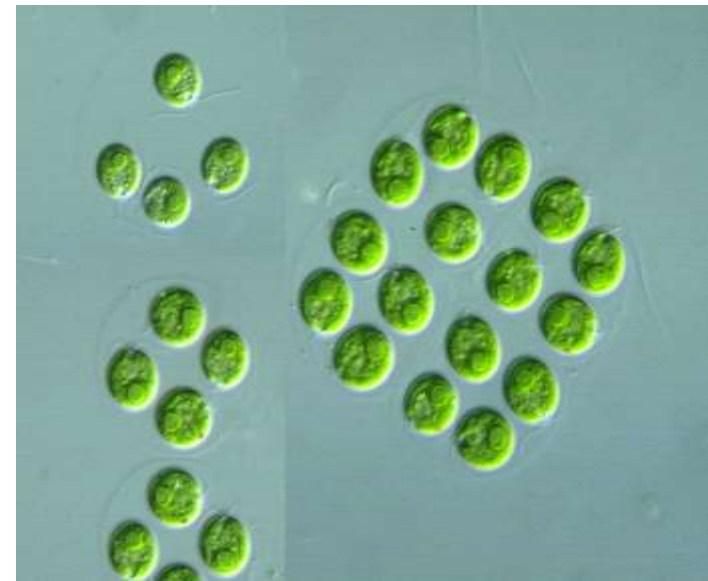


Fig. 3.1. *Chlamydomonas*. Structure of a single cell.



Contract vacuole

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



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).

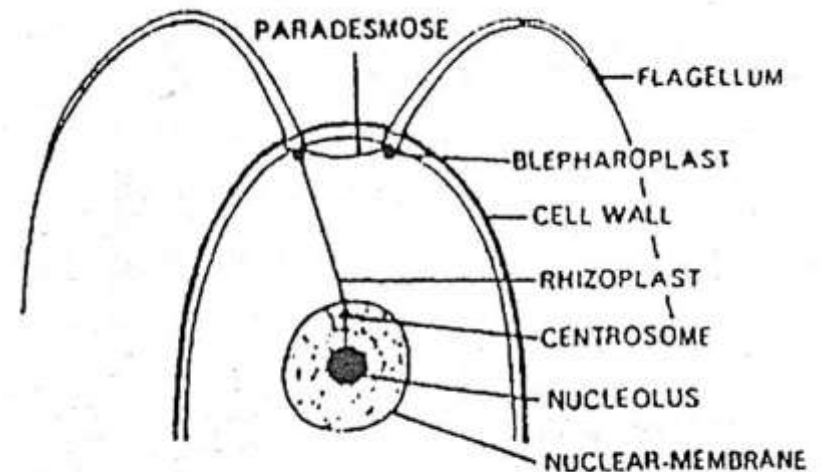


Fig.3.2. Chlamydomonas showing neuromotor apparatus.

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**.

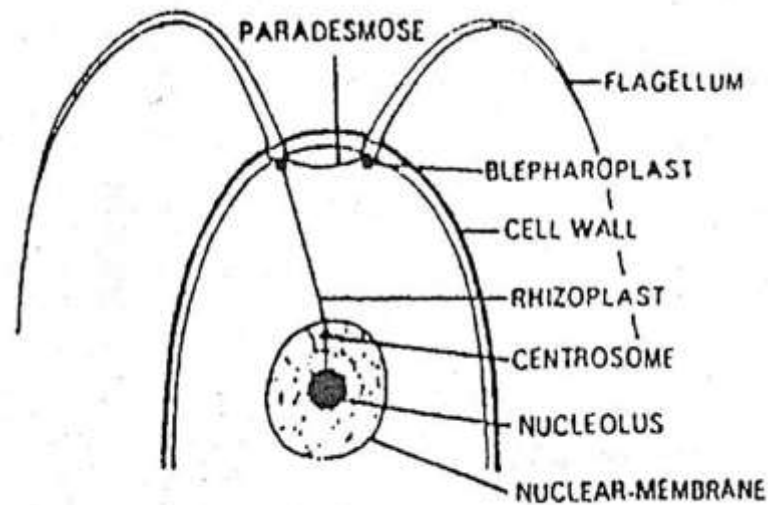


Fig.3.2. Chlamydomonas showing neuromotor apparatus.

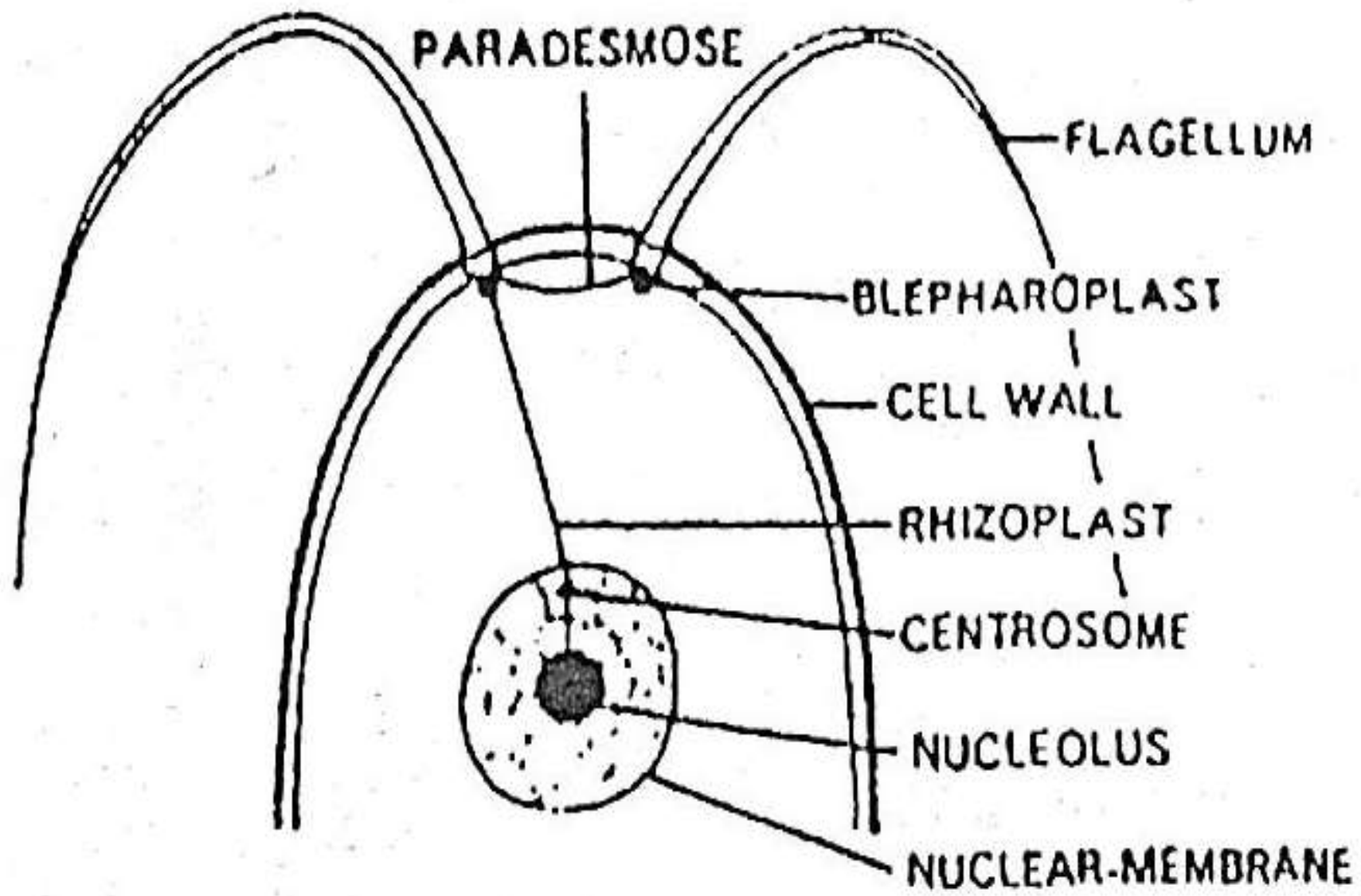
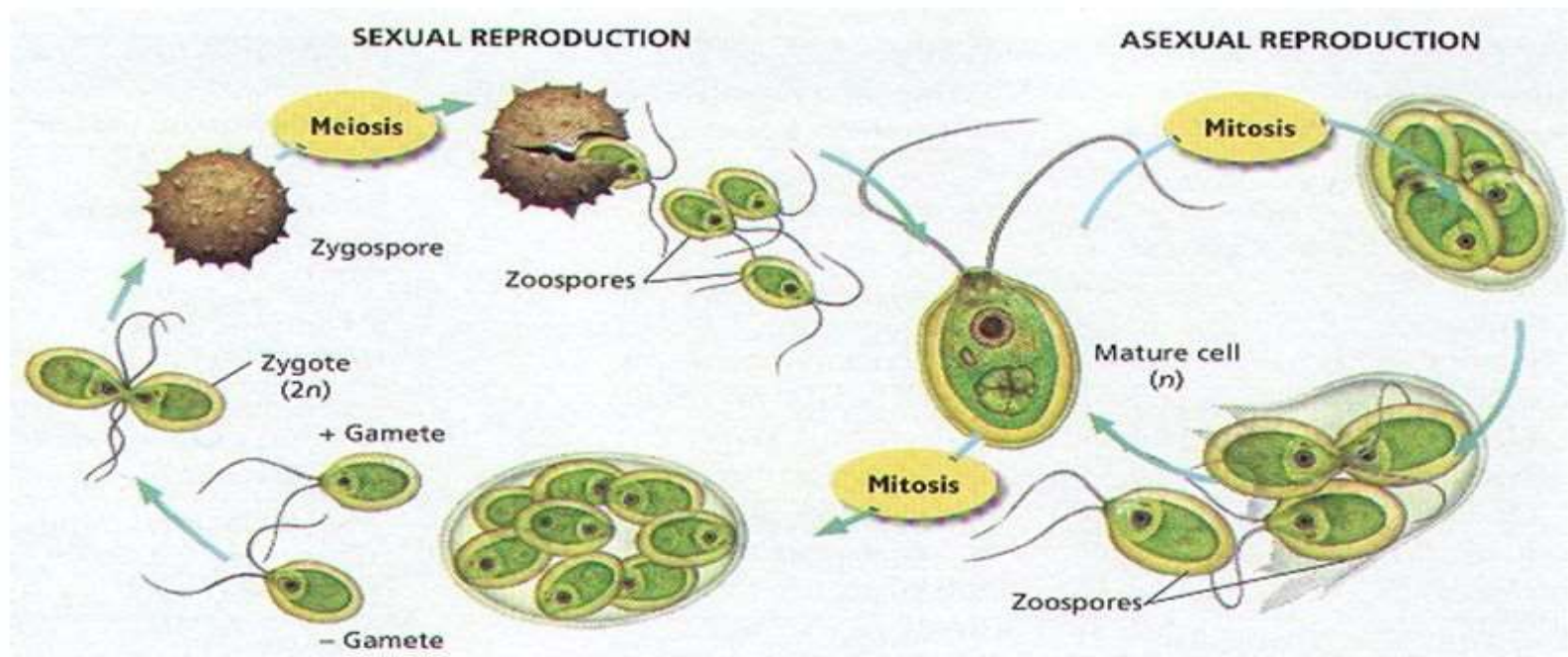


Fig. 3.2. Chlamydomonas showing neuromotor apparatus.

Chlamydomonas Life Cycle



Carteria Sp.

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



Chlamydomonas



Carteria