Faculty of Science

Department of Medical Technology

((General plant sciences))

1st stage

Lab (2)

LIVING (PROTOPLAST)

By

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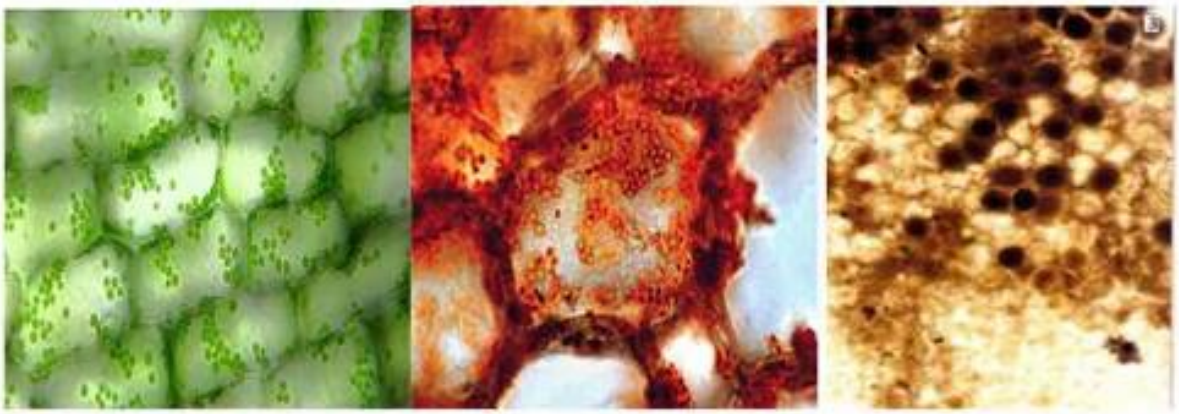
Lab 2.

Living (protoplast)

Chromoplast:

These are colored plastids (chromo=color; plast=living). They contain various pigments. They synthesize food materials by photosynthesis. They contain yellow, orange and or red pigments. Chromoplasts are found commonly in flowers and fruits. Chromoplasts also divided into three types based on their colour namely chloroplast, phaeoplast and rhodoplast:

a-Chloroplast: It is in green colour. It contains chlorophyll pigments. It is found in higher plants and green algae.



b- **Phaeoplast**: It is dark brown in colour. It contains fucoxanthin pigments. It is found in brown algae, diatoms and dinoflagelates.

c-Rhodoplast: It is red in colour. It contains phycoerythrin. It is found in red algae.


RED ALGA (RHODOPHYTES)


Leucoplasts:

They **are** non-pigmented plastids (Leuco=white; plast=living). Their main function is to store food materials. They do not involve in synthetic activities. The leucoplasts are subdivided into three types namely **amlyoplast**, **elaioplast** and **proteinoplast**.

1-Amlyloplast: It stores starch and found in tubers, cotyledons and endosperm

2-**Elaioplast**: it stores oil and found in the epidermal cells.

3-**Proteinoplast**: It stores protein and found in seeds and nuts.

CHLOROPLASTS

Chloroplasts are organelles found in plant cells and other eukaryotic organisms that conduct photosynthesis. The word chloroplast is derived from the Greek words *chloros*, which means green, and *plast*, which means form or entity.

Shape:

Chloroplast varies in shape. They are spheroid or ovoid or discoid in higher plants. They are **cup-shaped** in *chlamydomonas,* **star-shaped** in*Zygnema,***reticular-shaped** in *Cladophora* and**spirally coiled-shaped** in *spirogyra* (Figure 2-2).

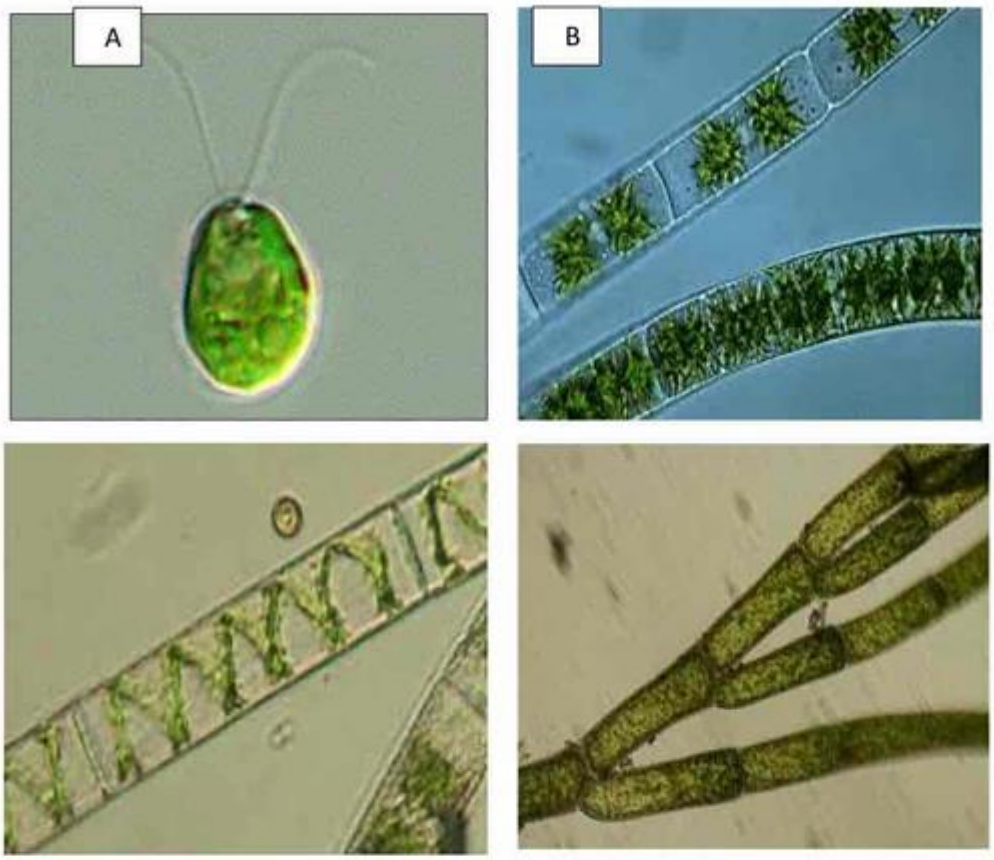


Figure 2-2 Chloroplasts shapes: A) cup-shaped in *Chlamydomonus*; B) Star-shaped in *Zygnema*; C) Reticular-shape in *Cladophora*and D)**spirally coiled-shaped** in *spirogyra*

Size

The size of the plastids varies from species to species. But the size remains constant for a given cell type. In higher plants, it is 4-5microns in length and 1-3microns in thickness. Generally **chroloplasts** of plants growing in shady places are larger in size.

Number:

The number of chloroplasts varies from plant to plant, but it remains constant for a given plant. In higher plants there are 20 to 40 chloroplasts per cell or upto 1000 chloroplasts.

Structure

Chloroplast is bounded by a double membrane called the **chloroplast envelope**. In addition to the **inner** and **outer** membranes of the envelope, chloroplasts have **a third** internal membrane system, called the **thylakoid membrane**. The thylakoid membrane forms a network of flattened discs called thylakoids, which are frequently arranged in stacks called **grana**. Grana are interconnected by branching membraneous tubules called frets (stromal lamellae). . Photosynthesis takes place on the thylakoid membrane. The stroma lies inside the envelope but outside the thylakoid membrane (Figure 3.5).

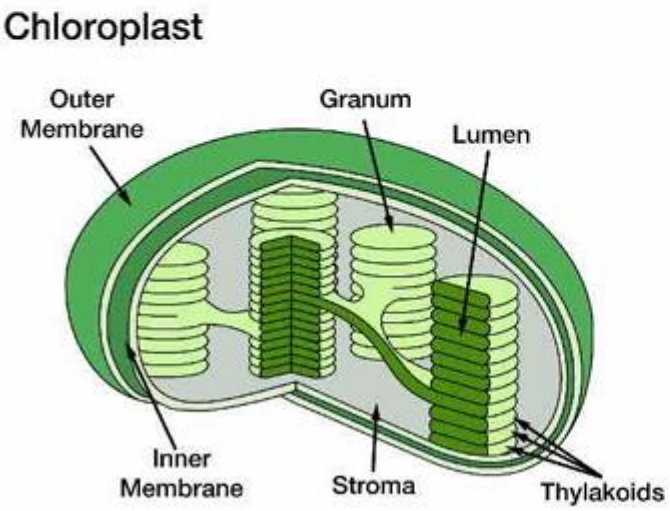


Figure 3.5: The structure of chloroplast