Lab 5

Division: Chlorophyta

Class: chlorophyceae

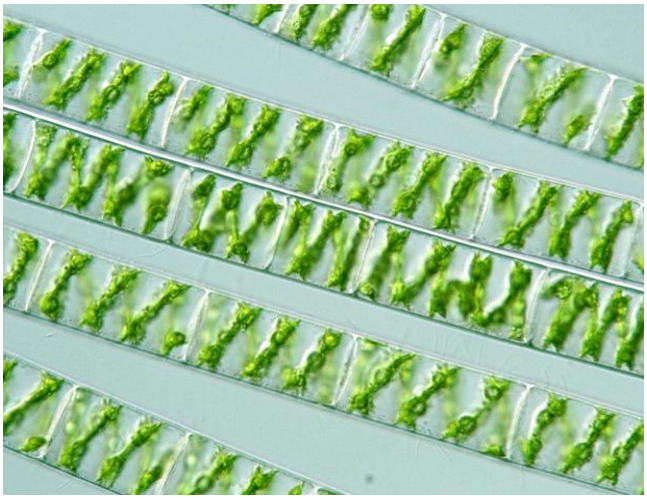
Order: Zygnematales

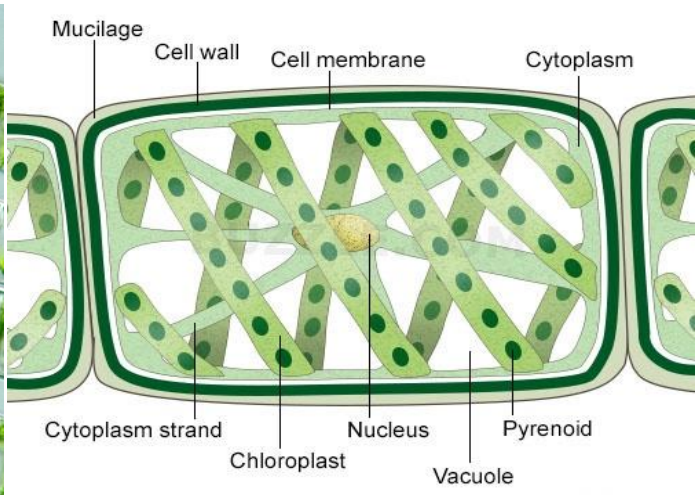
1- Family: Zygnemataceae Ex: *Spirogyra* , *Zygnema*

2- Family: Desmidiaceae Ex: *Micrasterius* , *Closterium*

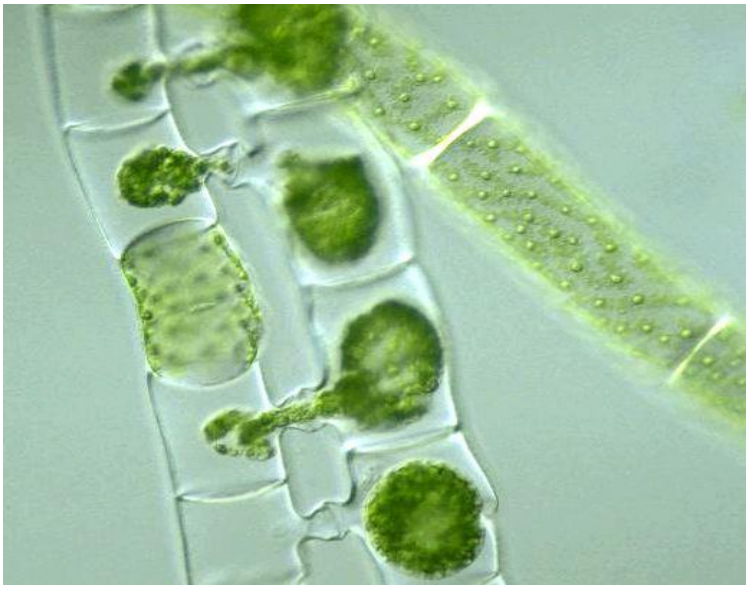
Spirogyra sp.

a- Unbranched filaments consist of hundred similar cells attached end to end in a single row.
b- It has spiral shape chloroplast.
c- These algae are characterized by two special types of sexual reproduction:
1- scalariform conjugation: occurs between cells of two opposite filaments in gendercome closely forming conjugation tube between the cells, follows by emptying whole male or (+) cell into the female or (-) cell in which the zygote is produced.
2- lateral conjugation: is rarely found and take place between adjacent cells of the same filament.
d- During conjugation, the filaments change from bright green to brownish in color.



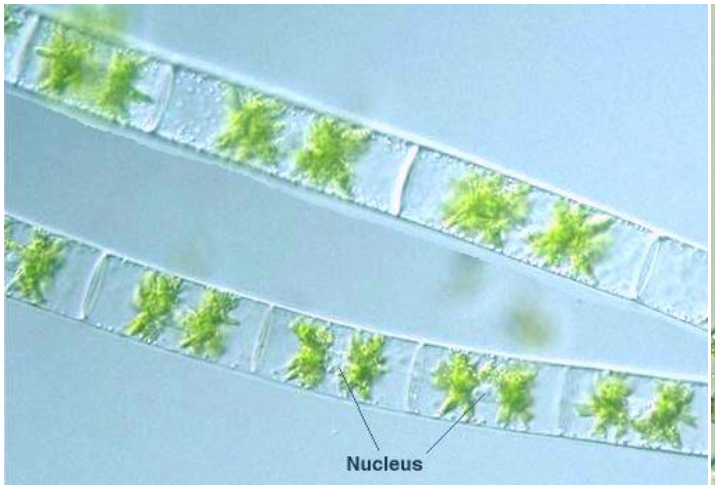


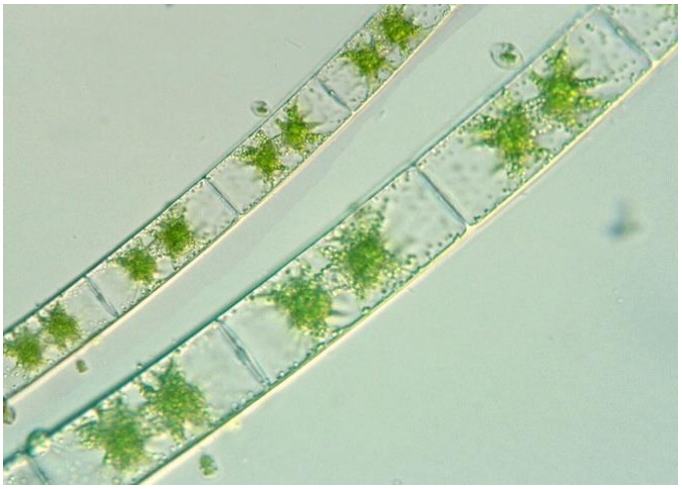
Spirogyra , Zygnema and some other closely related filaments can reproduce through both scalariform and lateral conjugation.

Zygnema sp.

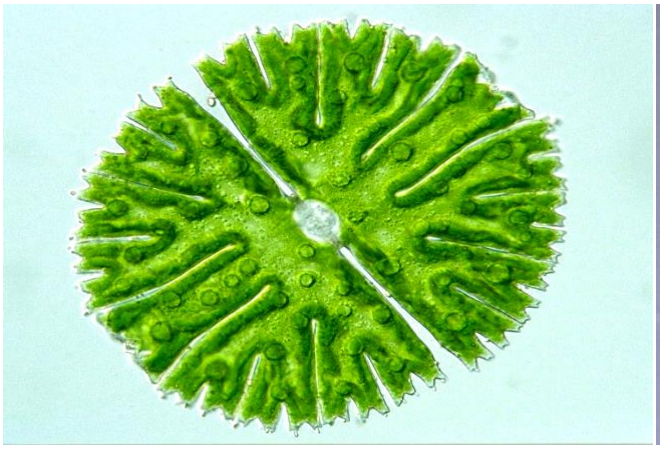
Is an unbranched filamentous algae. Unlike spirogyra, each cell has pair of stellate (star shape) chloroplast.

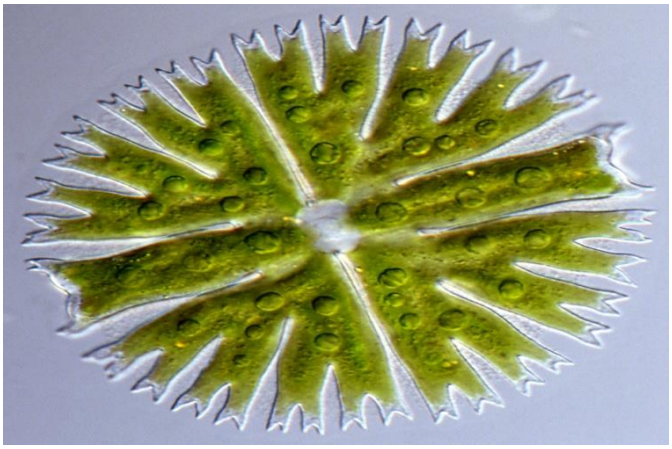




Micrasterias

Consist of two semi cell which separated by deep incision or sinus. The nucleus lies in the connecting zone that called isthmus.

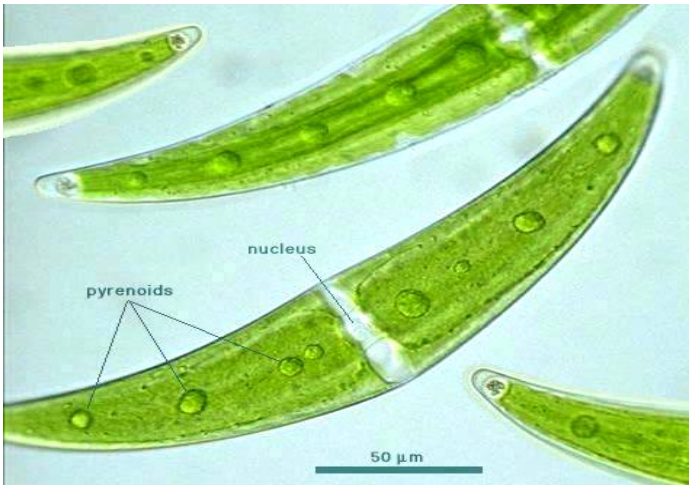




Closterium sp.

a- Unicellular consist from two symmetrical halves known as semi-cells with no constriction (sinus) in the middle.

b- Cells are crescent to lance shaped, tapering toward both ends which joined together by connecting zone called isthmus.



3- Division: Charophyta

Class: Charophyceae

Order: Charales

Family: Characeae

Genus: ***Chara*** , ***Nitella***

Charophyta

General characteristics of Charophyta

1- The plant body presents a great elaboration of vegetative structures (main axis, nodes and internodes)
2- Round antheridium (globule) and elongated oogonium (nucule) are large and can be seen even with the naked eye located at thee nodes.
3- Whorle branches (leaf primordia) surrounding nodes.
4- There is no asexual reproduction.
5- Commonly called **stone wort**.

Genus*: Chara*

a- the plant body consist of axis surrounded by cortical cells
b- the oogonium (nucule) locates above the nodes and the antheridium (globule) below it.
c- The coronal cells are five (found as corona upon oogonium).

Genus: ***Nitella***

1- The plant body consists of axis not surrounded by cortical cells.
2- The nucule (Oogonium) below the node, and the globule (antheridium) above it.
3- The coronal cells are ten (in two rows upon oogonium).

4- Division: Phaeophyta (Brown algae)

General characteristics

a- Exclusively marine.
b- Pigments (chlorophyll a and c in addition to **golden brown xanthophylls** pigments (**fucoxanthin**) responsible for the special color of the brown algae.
c- Photosynthetic products are **Mannitol** and **Laminarin**.
d- The cell wall has gelatinous nature and very important component (**alginate**) which absorbs water and helps the algae to avoid the desiccation.
e- Motile reproductive cells are pyriform or spindle-shaped and biflagellate (**heteroknot**).

Division: Phaeophyta

1- **Class: Isogenerateae**
   Order: Ectocarpales
   Family: Ectocarpaceae
   Genus: *Ectocarpus*

a- Branched filamentous thalli, forming bushy plants

b- **Heterotrichous** plant: **prostrate** (rhizoid-like) and **erect**

c- Life cycle is **isomorphic**: include alteration of two similar in size and shape generation (**Gametophyte** and **sporophyte**)

d- Cells have **band-shaped** chloroplast

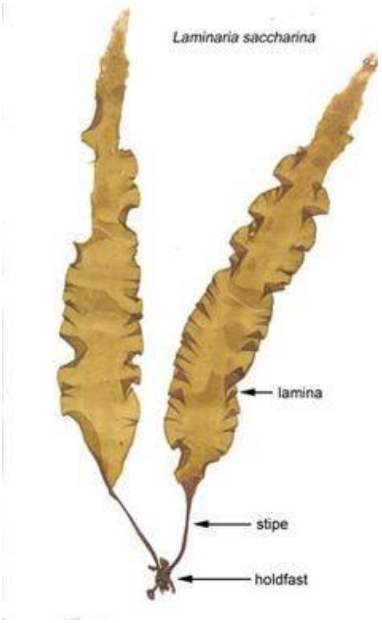
Division: Phaeophyta

2- **Class Heterogenerateae**
   Order: Laminaiales
   Family: Laminariaceae
   Genus: Laminaria

a- Giant algae have tough, leathery thalli which differentiate into stalk and blade.

b- The commen name is **Kelps**

c- Life cycle is **Hetromorphic**: alteration of generation (large and long live sporophyte alternating with small filamentous gametophyte).



Division: Phaeophya

3- Class: Cyclospora

Order: Fucales

Family: Fucaceae

Genus: *Fucus*

a- The thallus is leathery, flattened and dichotomously branched

b- The common name is **Rock weed**

c- The life cycle is **cyclospora: because the gametophyte reduced into only male and female gametes (antheridia and oogonia) within sporophyte itself.**

Rhodophyta (Red algae)

General Characteristics of Rhodophyta

a- The pigments are **chl.a** and **chl.d** plus **phycobilins:** the **red** one (r-phycoerythrin) and **blue** pigment (**r-phycocyanin)**.

b- Floridean starch as a storage product in cytoplasm not in chloroplast.

C- Absence of flagella.

d- Sexual reproduction is complex, the male sex organ called **spermatangium**, the non-motile male gametes are called **spermatia**. The female sex organ called **carpogonium.**

Division: Rhodophyta

Class : Rhodophyceae

Order : Ceramiales

Family: Rhodomelaceae

Genus: *Polysiphonia*

a. It is heterotrichous.

b. The thallus is **a polysiphonous** in nature.

c. Growth in length by means of a single, **dome-shaped apical cell**.

d. The feathery, upright portion consisting of two types of branches: (1) **ordinary branches** (similar to the main axis) bearing numerous small branches called the (2) **trichoplast** (uniseriate, usually coloreless and bear the sex organs).

e. The life cycle is **triphasic** (**carposporophyte**, **tetrasporophyte** and **gametophyt**)

Xanthophyta (Yellow green algae)

General Characteristics of Xanthophyta

a- Posses chl.a and chl.c plus a special type of **xanthophyll** called **diadinoxanthin** but lack **fucoxanthin**.

b- Food product from photosynthesis is **chrysolaminarin**.

c- Cell wall is often absent and if present has large amounts of **pectic compounds**. The cell wall has **silica** in a few species.

Division: Xanthophyta

Class : Xanthophyceae

Order: Heterosiphonales (Vaucheriales)

Family: Vaucheriaceae

Genus: *Vaucheria*

a- Branched filamentous algae has coenocytic axis with septa.

b- There are two types of Vaucheria:

Vaucheria sessilis

The oogonium is beside the antheridium.

Vaucheria geminata

The oogonium is within or above the antheridium.

Bacillariophyta (Diatoms)

General Characteristics of Bacillariophyta

a. comprises single class called **Bacillariophyceae,** popularly known as **diatoms**.

b. Posses **chl.a** and **chl.c** and f**ucoxanthin.**

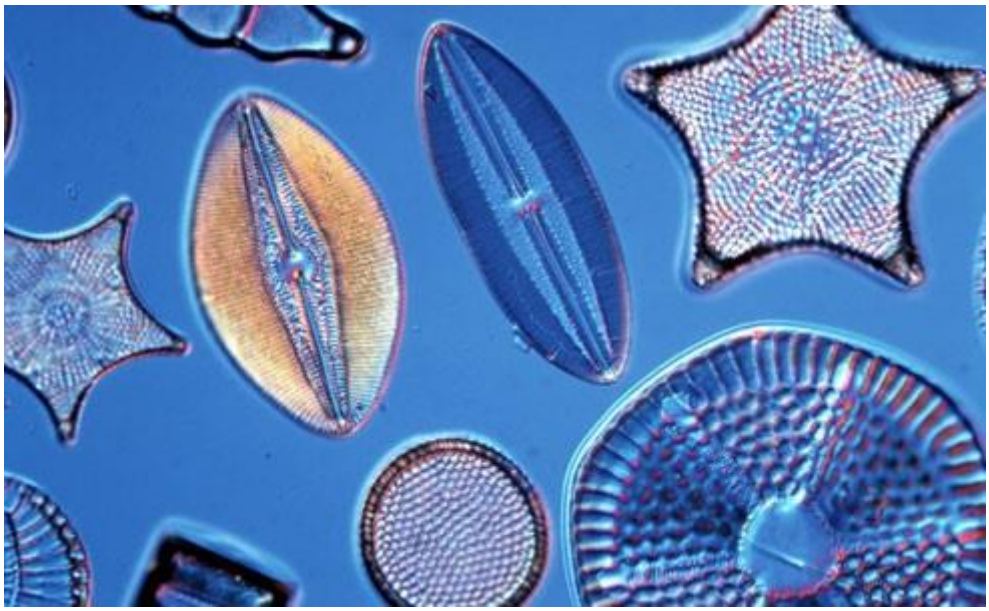
c. The food as **oil** and **chrysolaminarin** or a protein-like food material called **volutin**.

d. The cells are surrounded by a rigid cell wall-box like in shape called **Frustule**. The cell wall is **silicified**.

e. **The diatoms placed under two taxonomic groups:**

1. **Order: pennales**: are pen-shaped, the structure exhibits **bilateral symmetry**. The diatoms of this order called **pennate diatoms** (common name).

2. Order: Centrales: are cylindrical shaped, the structure exhibits **radially symmetry**. The diatoms of this order called **centric diatoms** (common name).



Hepatophyta (liverworts)

General characteristics of Hepatophyta

a- All hepatics are dorsiventral in structure.

b- Small in size never more than a few inches in length.

c- Gametophyte is composing from leafy lobed thallus look like a liver in form therefore the Common name of these plants is liverworts.

d- The sporangium is either differentiated into foot, seta and capsule or foot and capsule.

Division: Hepatophyta

Class: Hepatopsida

Order: Marchantiales

Family: Marchantiaceae

Genus: *Marchantia*

- **Genus: *Marchantia*:**

a- It's a dorsiventral plant because both upper and lower surfaces of its thallus are differentiated into some specialized tissues and structures as follows : The upper surface of the plant body is divided into:

1) polygonal air chambers each with 2) central pore. 3) The photosynthetic cells which surround the air chamber are rich in chloroplast. The reminder is made of densely arranged parenchymatous cells serve as storage cells.

b- From the the ventral surfrace of thallus, rhizoid and scales are emerge.

1) Rhizoid is two types: a) smooth and b) tuberculate which serve in water conduction

2) scales serve in plant anchored.

c- Reproduction in Marchantia it happen by:

1- Vegetative reproduction: (fragmentation, formation of adventitious branches and gemmae formation).

Marchantia gemmae (it is a type of asexual reproduction represents by lens-shaped muticellular bodies with double notched which are attached to the bottom of the gemma cup by short stalk)

2- Sexual reproduction: The Gametophtye

Marchantia is unisexual, The gametophore is bearing the sex organs if its bears male sex organ (antheridia) then it is called **1) antheridiophore** which is discoid in shape and one bearing archegonia is called **2) archegoniophore** which is umbrella like in shape

3- Asexual Reproduction: **The Sporophyte**