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Division: Cyanophyta

Cyanobacteria, Blue-Green Algae

Lab-2

Divisions of Algae

- Cyanophyta (**blue -green algae**).
- Chlorophyta (**green algae**).
- Charophyta.
- Chrysophyta (Diatoms, **yellow-green algae**).
- Phaeophyta (**brown algae**).
- Rhodophyta (**red algae**).
- Phyrrophyta (**Dinoflagellates**).
- Euglenophyta (**Euglenoids**).

Division: Cyanophyta

- The members of this group are known as **Blue green algae & Cyanobacteria because of characteristic similarities with bacteria**.

- This is a cosmopolitan in distribution and including **150 genera** and about **2500 species.**

The important features of the Cyanophyta is as follows:

1. The main pigments include **C-phycocyanin** and **C-phycoerythrin.**

besides other usual pigments (e.g. **chl-a, β-carotene, flavein,** etc.) so the members are known as "**Blue green algae**".

The important features of the Cyanophyta is as follows:

2. The majority of the members are **fresh water**, **terrestrial** and some are **marine** also,

some of them are **Chasmolithic** (on rock), **Epiphytic** (in plant body) e.g. *Nostoc*, **Cryophilic** (on snow), **Holophylic** (on salty water) and in symbiotic association e.g. lichens.

3. The cell is **prokaryotic** in nature.

The important features of the Cyanophyta is as follows:

4. **Reserve products** are **Myxophycean starch** and **Cyanophycin**.

5. **Cell wall** consists of **pectin** and also **cellulose** in some quantity.

6. **Motile structures** (Flagella) are completely **absent**.

7. **Sexual reproduction** is completely **absent.**

The important features of the Cyanophyta is as follows:

9. **'False' branching** is seen in some filamentous members e.g. ***Scytonema*** and ***Tolypothrix***.

-

10. **Vegetative reproduction** are **fission**, **fragmentation**, **hormogonia**, **akinetes**, and **asexually** by **endospores**, **exospores**, **nanocyst** etc.

How can you identify the species of Cyanophycea?

I. **Prokaryotic cellular organization** (no true nucleus).

II. **Reserve food material** in the form of cyanophycean granules.

III. **No sexual reproduction**.

General classification

Division: Cyanophyta
Class: Cyanophyceae
Order: Chroococcales
Family: Chroococaceae
1- **Genus:** ***Gloeocapsa***
2- **Genus:** ***Chrococcus***

Common occurrence: Marine or fresh water.

❖Recently taxonomists divide the class into two tribes with seven orders:

❖A). Tribe Coccogoneae (**Unicellular** and **non-filamentous)**

❖Order 1. **Chroococcales**
❖Order 2. **Chamaesiphonales**

B) Tribe Hormogoneae (Filamentous blue green algae)

Order 3. Oscillatoriales
Order 4. Nostocales
Order 5. Scytonematales
Order 6. Stigonematales
Order 7. Rivulariales

Order: Chroococcales:

- Members may be **unicellular** or **multicellular colonial**, enclosed in **mucilage matrix**.
- **Vegetative reproduction** by **fission** or **fragmentation**.
- Presence of **nannocytes**.

Family: Chroococaceae

External features:

1. Cells are **arranged in groups** or **colonies.**
2. Number of the cells in a colony ranges from **2 to 8**.
3. Each cell of the colony is **spherical** in shape.
4. Colonies are surrounded by many **concentric envelopes** or **mucilage sheath** which may be **colorless** or **colored**.
5. Each concentric envelope may be **lamellated** or **unlamellated**.

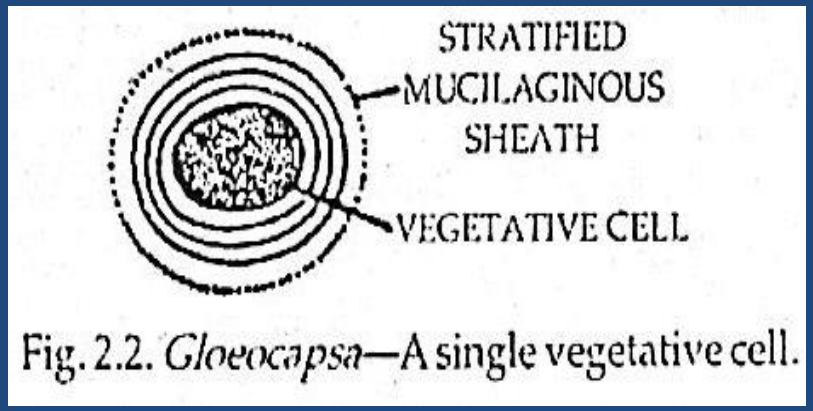


Fig. 2.2. *Gloeocapsa*—A single vegetative cell.

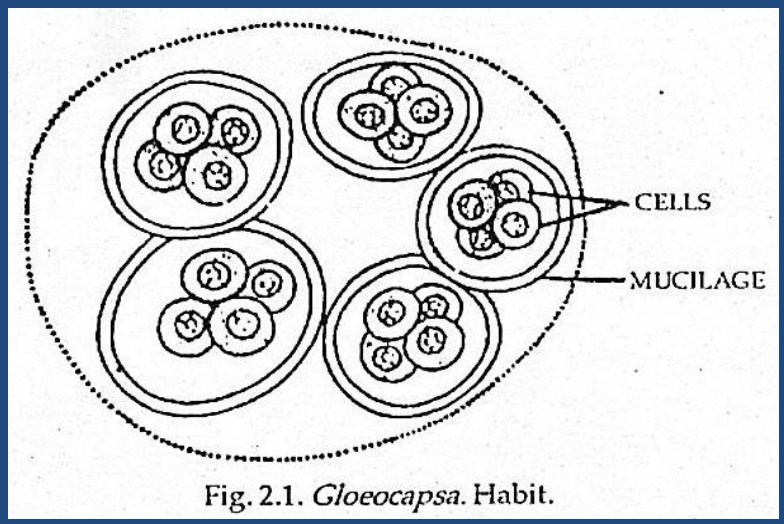


Fig. 2.1. *Gloeocapsa*. Habit.

6. Each Cell of the colony has its **individual sheath**.
7. Cell wall consists of **two layers** i.e. **cellulose** and **pectin.**

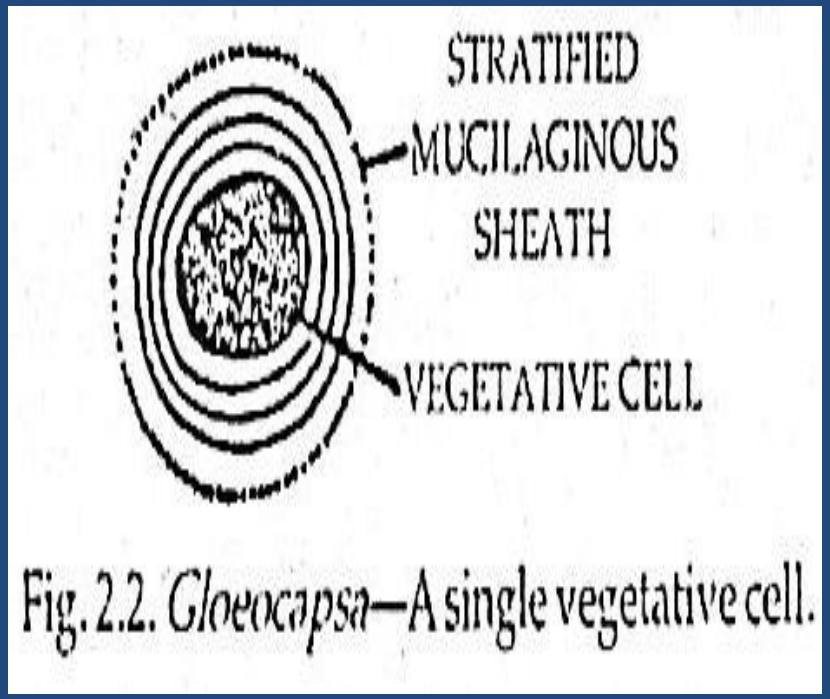


Fig. 2.2. *Gloeocapsa*—A single vegetative cell.

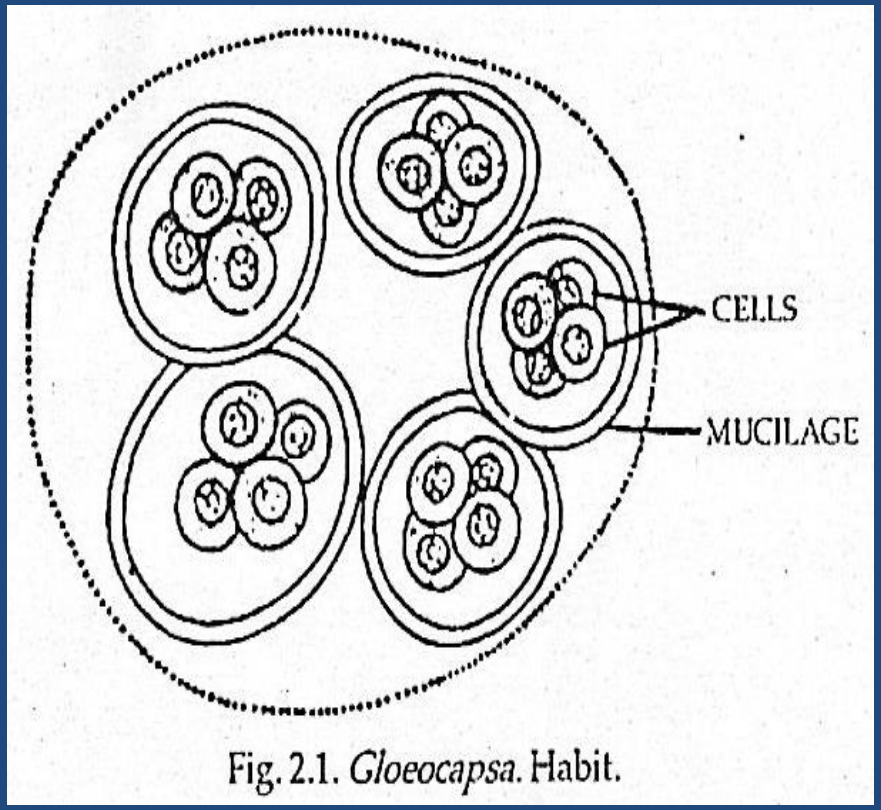


Fig. 2.1. *Gloeocapsa*. Habit.

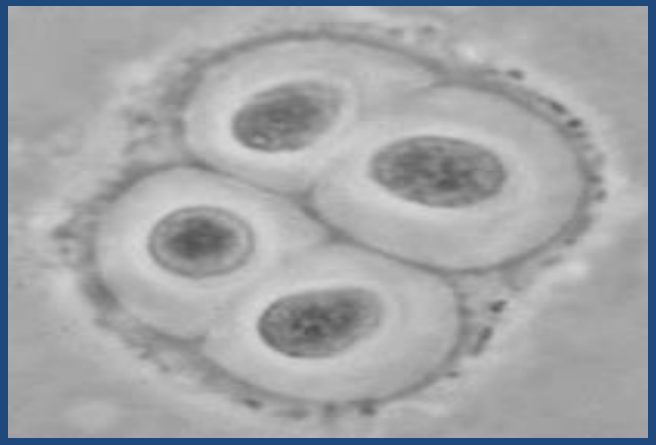
Reproductive structures

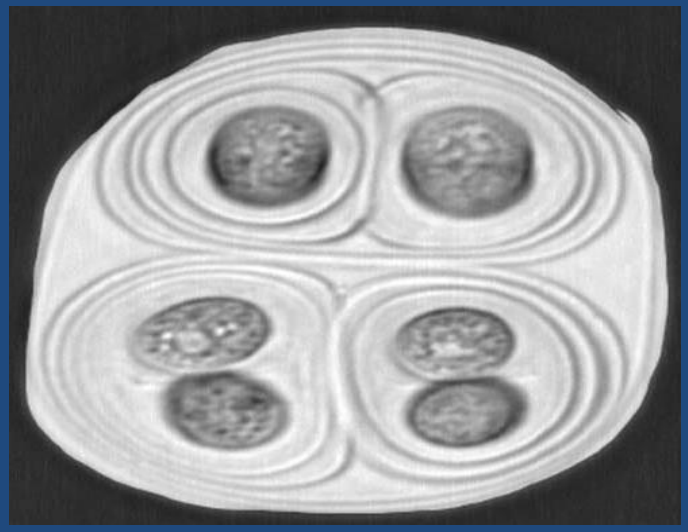
- **It reproduces vegetatively** by **fission** in which cell divides regularly in three directions.

- **Asexual reproduction** is reported by the formation of **nannocytes** **only in some species**.

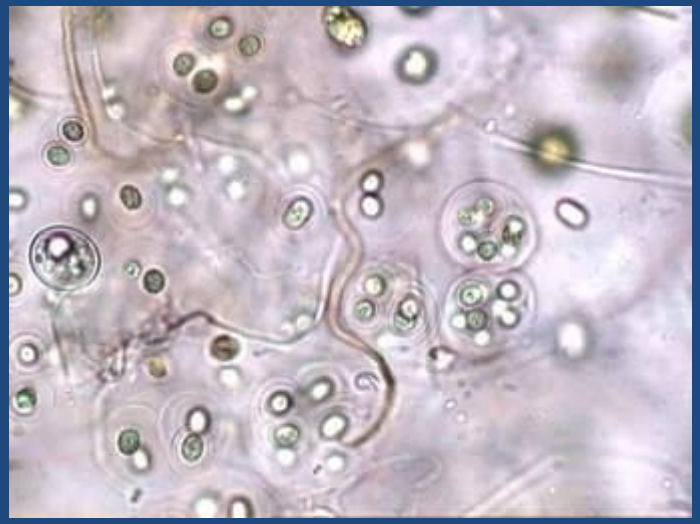
Genus *Gloeocapsa*

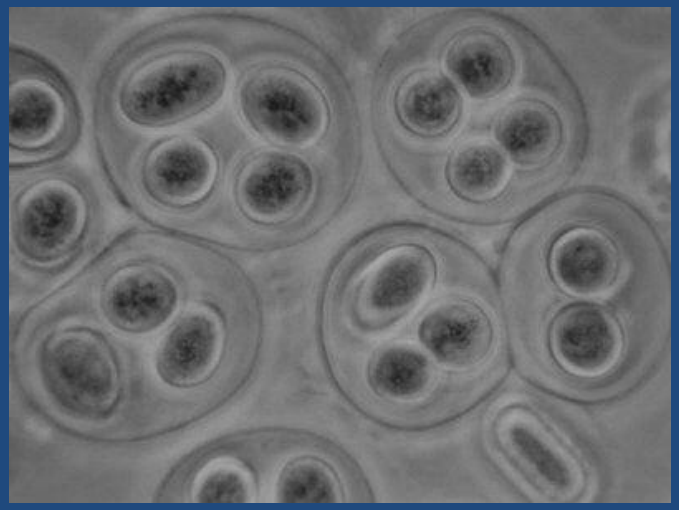
- Living in **Marine** or **fresh water**.
- Number of the cells in a colony ranges from **2 to 8 cells.**
- Each cell is enclosed by a **distinct stratified mucilage sheath.**
- Cells are **oval** or **spherical** in shape.

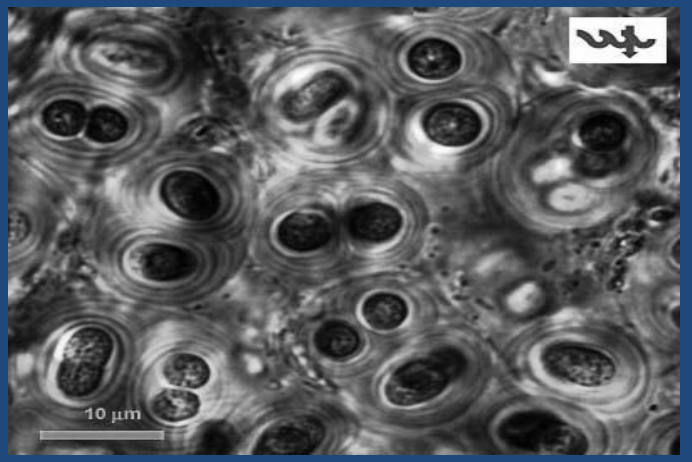




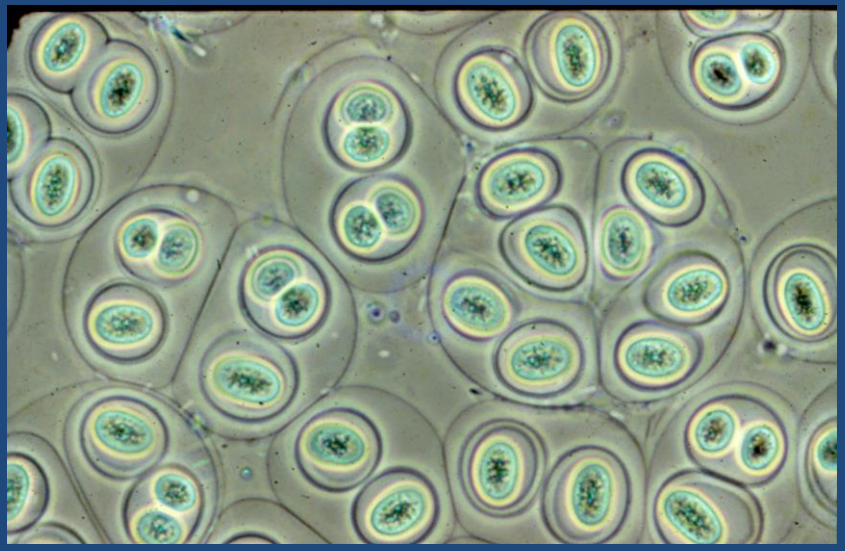
Some examples of *Gloeocapsa*







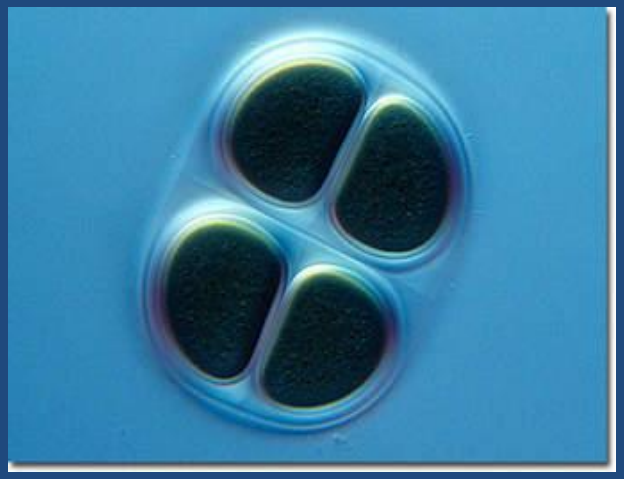

Keweenaw Algae
20 µm
©Jason Oyadomari

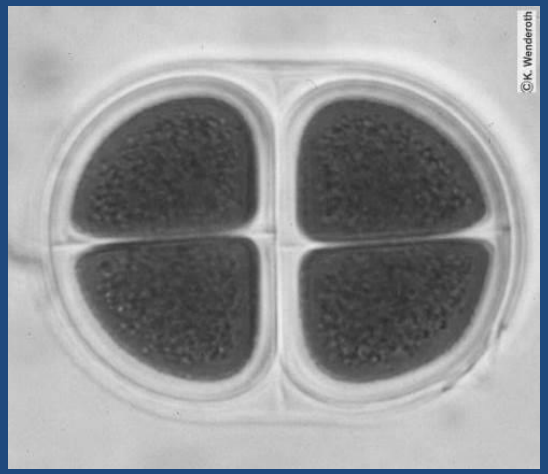


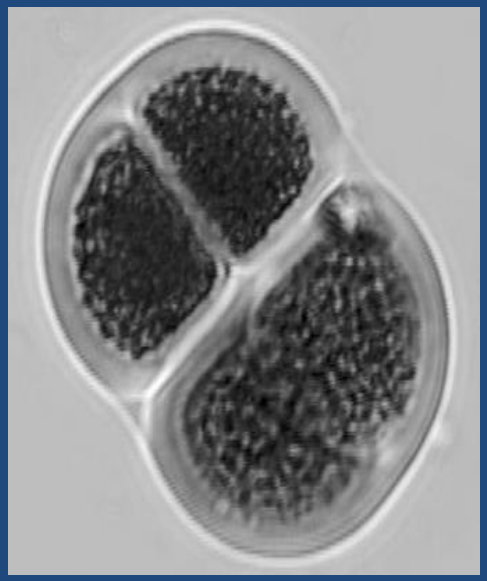
Genus *Chrococcus*

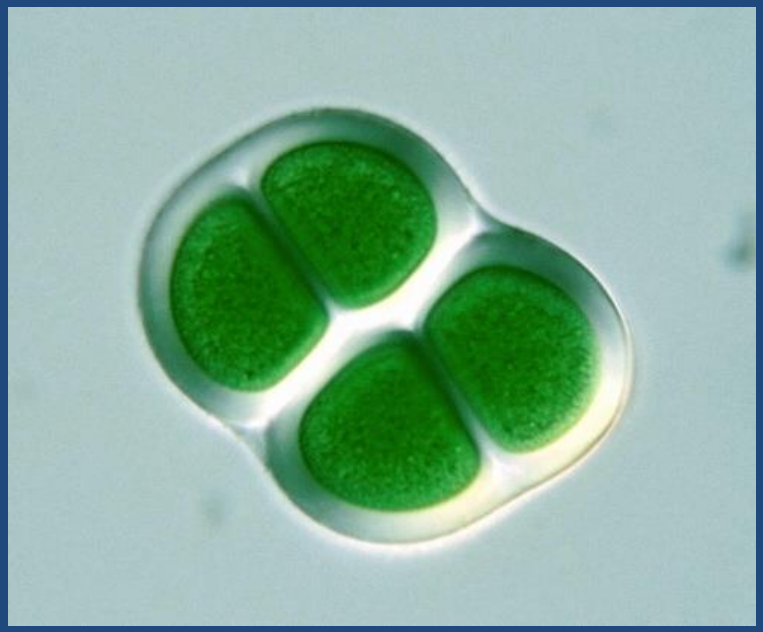
1. ***Chroococcus*** is unicellular or grouped in **2 – 4 cells.**
2. Each group of cells is surrounded by its own sheath of **mucilage** which is **thin** & **colorless.**
3. The cell is filling the **sheath**, i.e the size of cells of ***Chroococcus*** is **larger than** ***Gloeocapsa***.

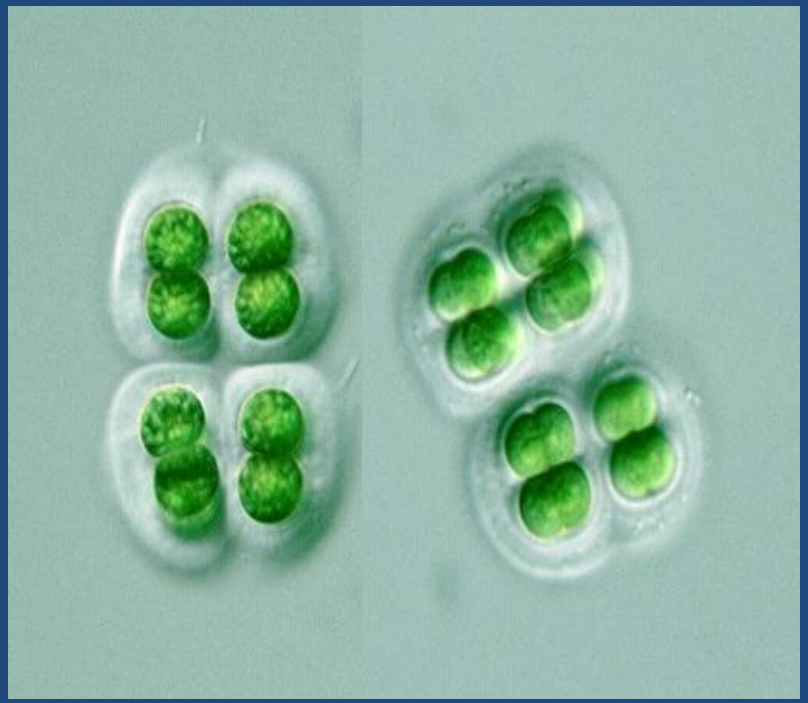
Some examples of *Chrococcus*

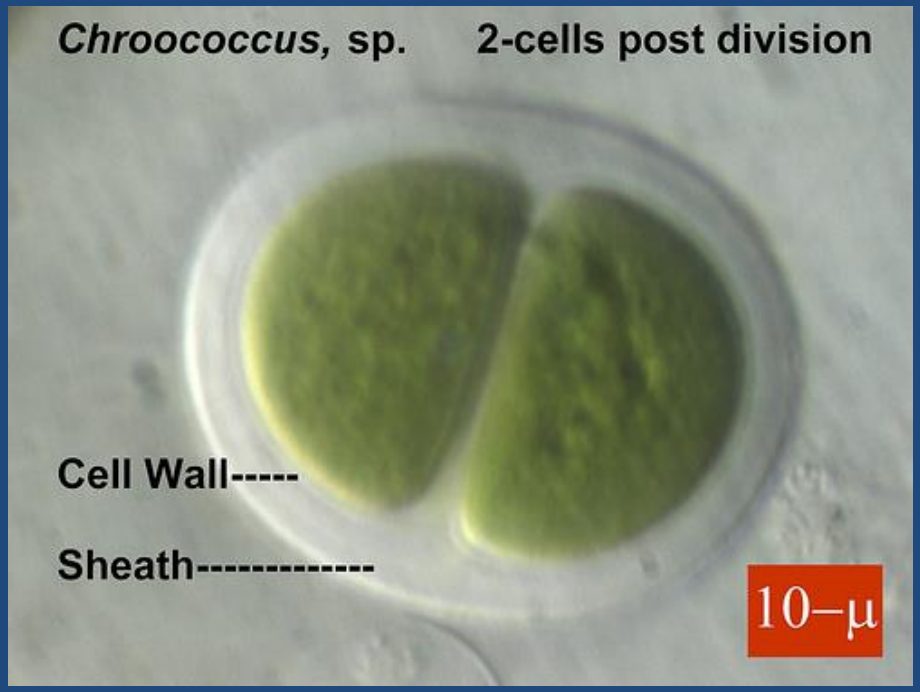











Chroococcus, sp. 2-cells post division
Cell Wall-----
Sheath----------
10–μ

Meaning:

Hormogonia: a portion of a filament in many cyanobacteria that becomes detached as a reproductive body.

Heterocyst: Thick wall cells with hyaline protoplast, characterizing by lacking of reserve materials and gas vacuoles.

Function: **Fixing atmospheric nitrogen. It has also a role in reproduction.**

Akinete: large thick wall cells, full of reserve material, which enable the species of algae to survive along periods when environmental conditions are not favourable to growth. It has also a good role in reproduction.

Thanks for your attention