

General Features

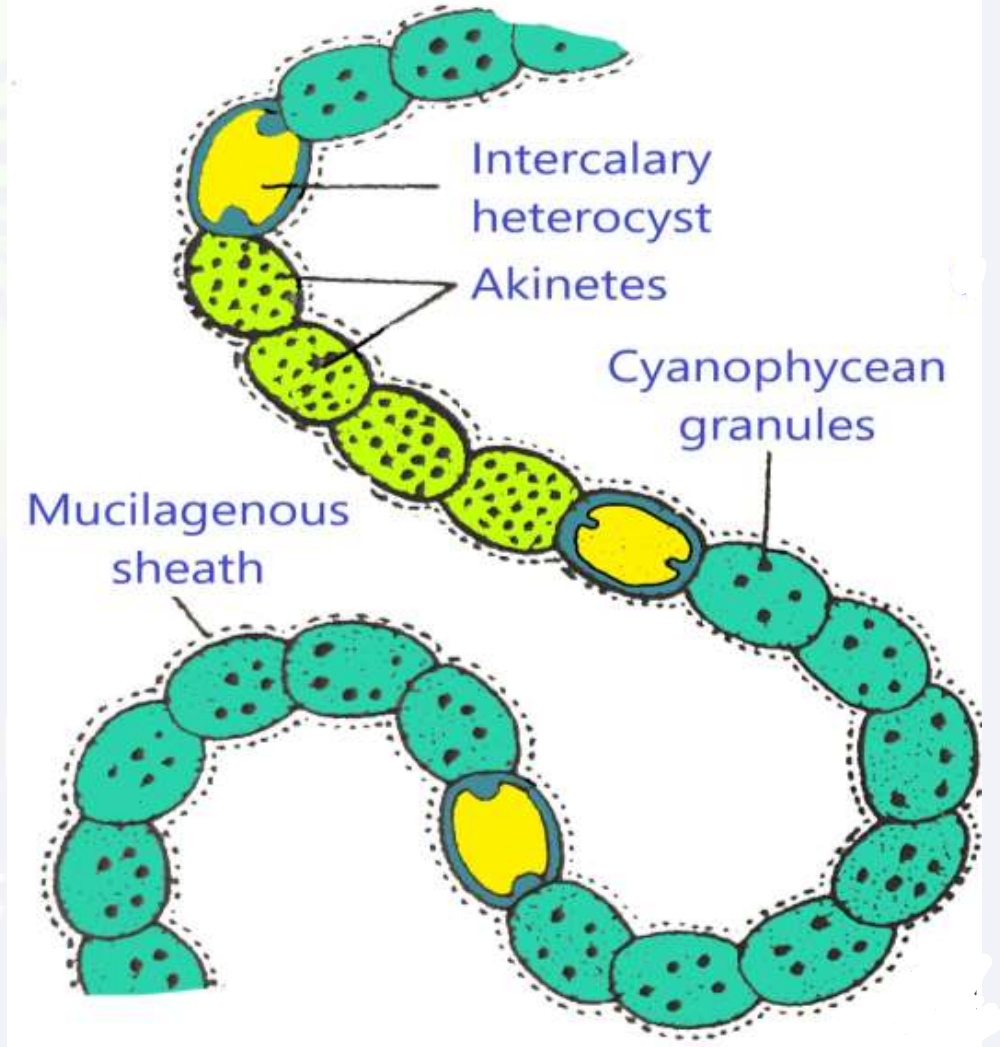
- Blue-green-Algae or Cyanobacteria.
- known as star jelly, troll's butter
- Fresh water, terrestrial.
- *Nostoc punctiforme*: Endophytic in *Anthoceros* (Bryophyte), Coralloid root of *Cycas* (Gymnosperm)
- *Nostoc azollae*: symbiotic association with Azolla.
- Perform Nitrogen fixation.
- *Nostoc sphaericum* & *Nostoc collema*: Component of Lichens; also occurs in symbiotic association with fungi.

Classification

Class: Cyanophyceae

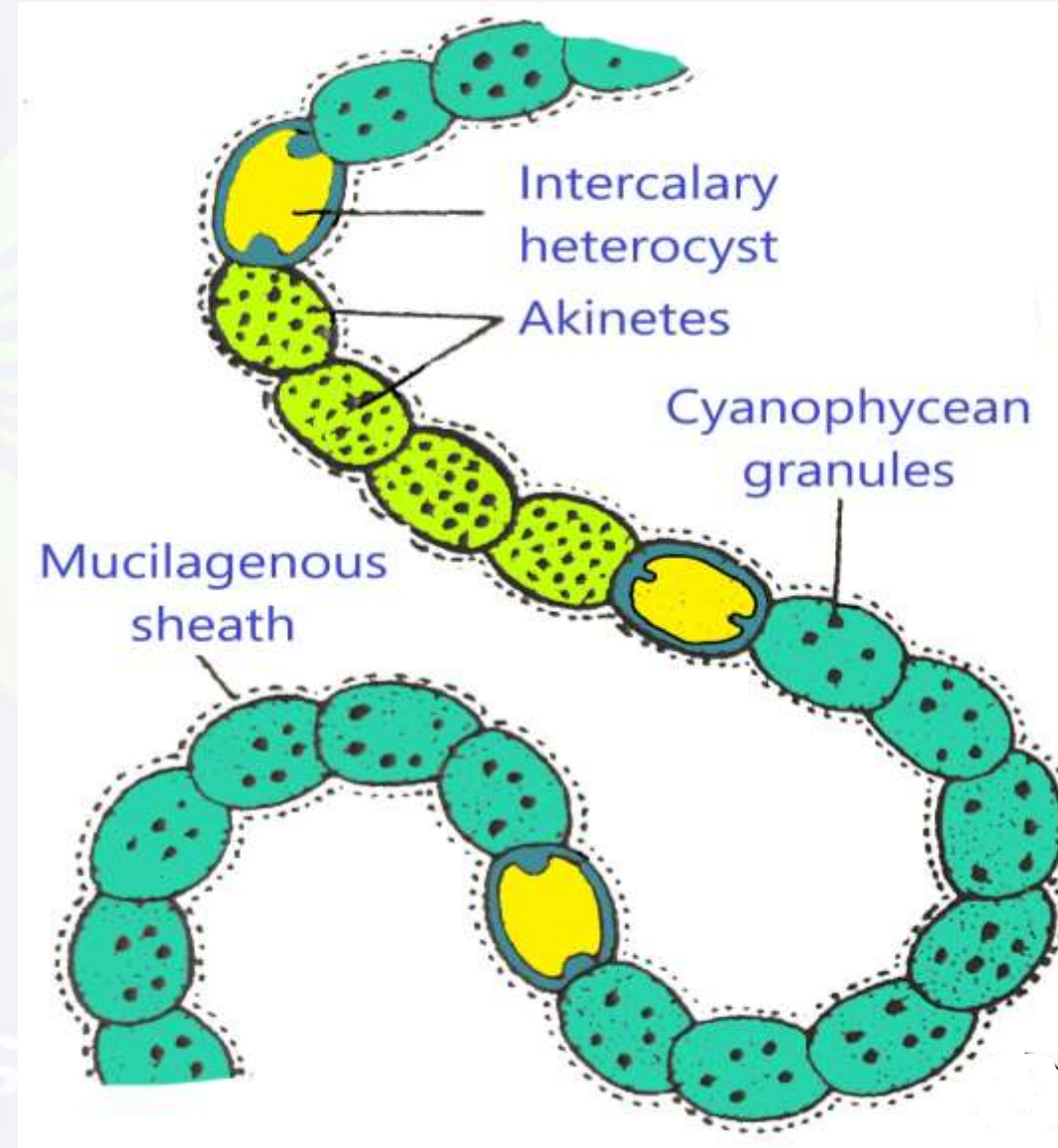
Order: Nostocales

Family: Nostocaceae



Thallus structure

- Trichomes are uniseriate, twisted.
- prominent constriction between cells.
- Each trichome is covered with a gelatinous sheath. Transparent, Hyaline, or colored.
- Many trichomes aggregate and their gelatinous sheath dissolve to form colonies of various shapes.
- Heterocyst (intercalary, occasionally terminal). Size similar to vegetative cells.
- **Intercalary Heterocyst has two polar nodules** and Terminal heterocyst has one polar nodule.

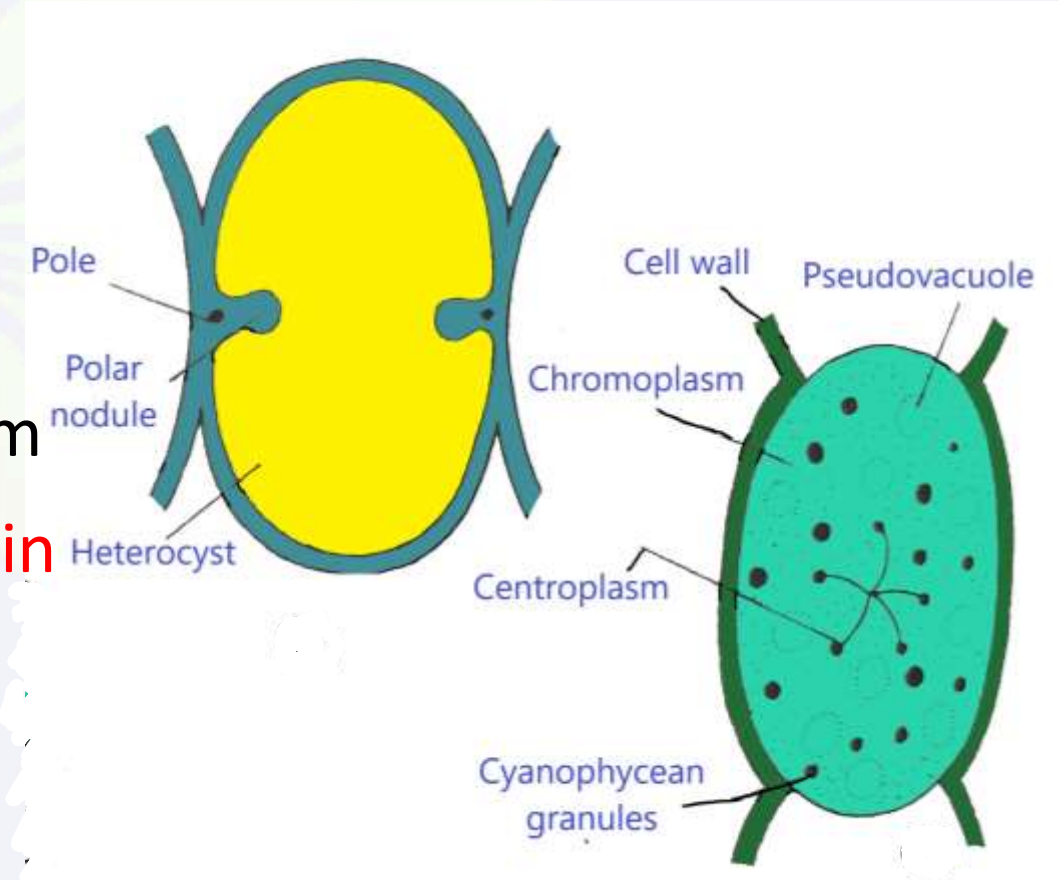


Cell structure

- Cells are spherical or rounded.
- Exhibit typical cyanophycean cell structure
- Cell wall- Mucopolymeric
- Protoplasm- peripheral chromoplasm

Central Centrioplasm/Nucleoplasm

- Chromoplasm- Cyanophycin, protein granules, and Cyanophycean starch.
- Lack nuclear membrane, and nucleolus.



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Reproduction

- Only Vegetative reproduction.

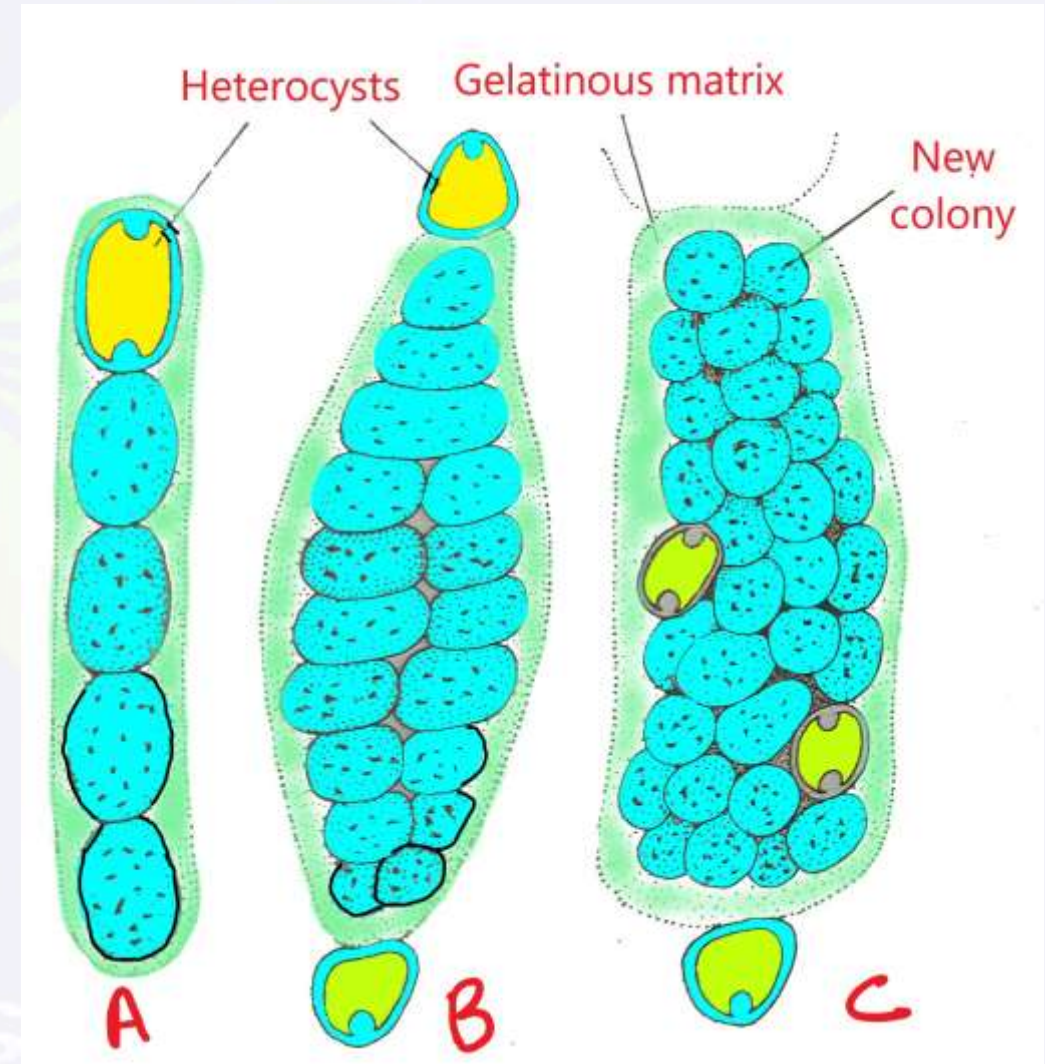
1. Fragmentation
2. Hormogonia
3. Akinetes
4. Heterocyst
5. Endospores



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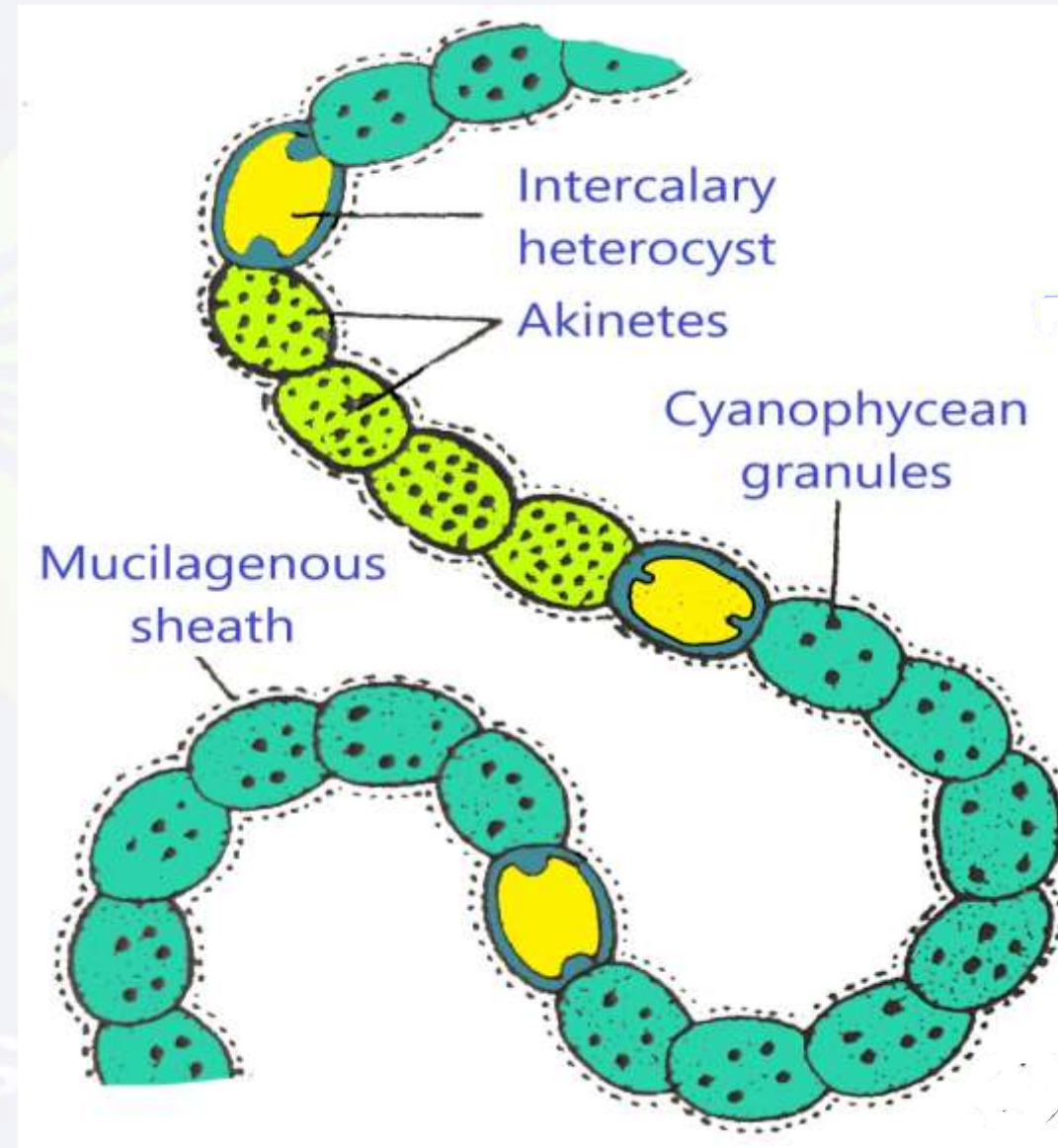
Hormogonia

- Degeneration of intercalary vegetative cells or due to intercalary heterocyst.
- Trichome break into a small segment
- This multicellular segment is **hormogonia**.
- divide rapidly inside the gelatinous sheath.
- and form new colonies.



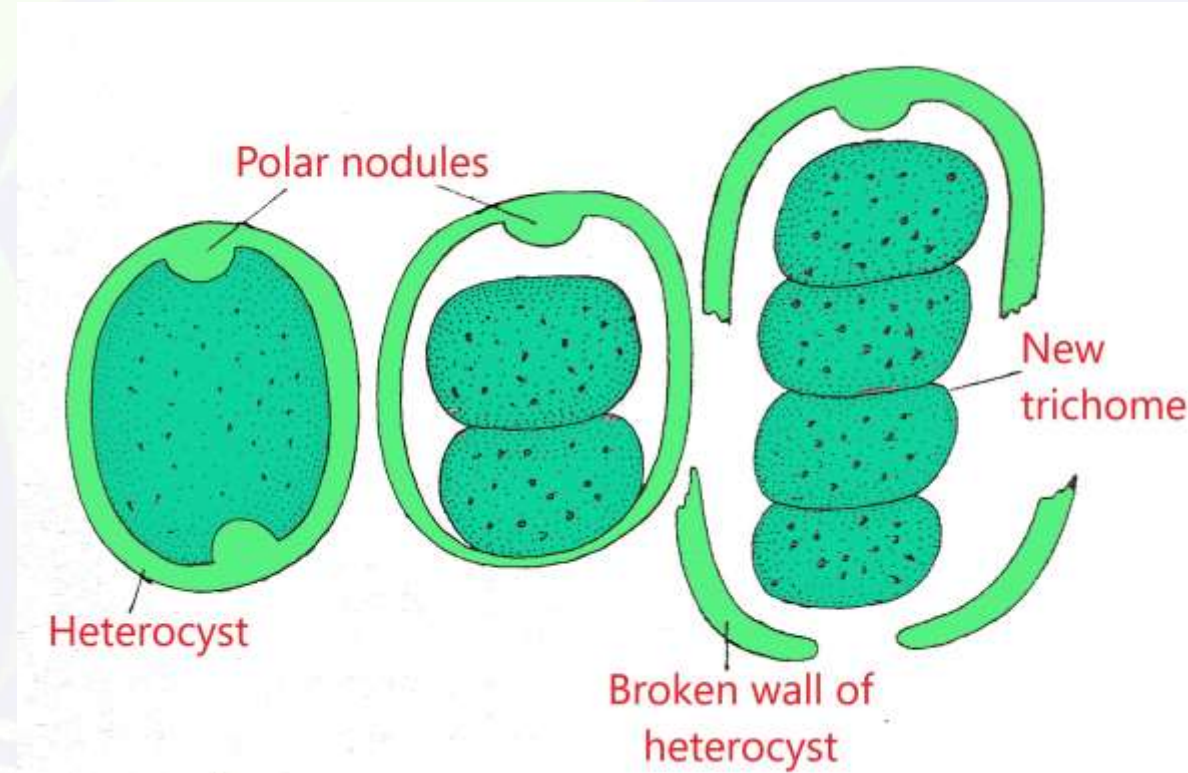
Akinetes

- Unfavourable condition
- Trichome transformed into resting spore or akinetes.
- Additional three-layered coating outside the cell wall.
- Protoplasm rich in food reserves.
- Vegetative cells adjacent to heterocyst.
- heterocyst secretes some chemicals which stimulate akinetes formation.
- Resistance for cold, drought.
- During the favorable condition protoplast become active, break the wall and form new trichome.



Heterocyst

- *Nostoc commune*
- Heterocyst act as a resting spore.
- At time of germination- protoplast divide by a transverse wall.
- Both cells divide again and form 4-celled germling.
- Thick wall rupture.
- Germling develop into new trichome



Endospore

Nostoc commune, *Nostoc microscopicum*

The protoplasm of the Heterocyst divide, and form Endospores.

Endospores are thin-walled.

Wall disintegrate and spore germinates to form a new trichome.

Fusion of Filaments

- Sex organs and Sexual reproduction is absent.
- Fusion of trichomes observed in *N. muscorum*
- This phenomenon is compared with Somatogamy.

Economic Importance

- Nitrogen fixation used as **biofertilizers in rice fields**.
- Rich in **protein** and **Vitamin C**. [e.g.- *N. flagelliforme*, *N. commune*]
- *N. muscorum* accumulate **polyhydroxy butyrate**, a precursor of plastic.
- Bioremediation of waste water and
- **degrade environmental pollution**.

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