علم الأحياء الدقيقة

Microbiology

Introduction to Bacteriology

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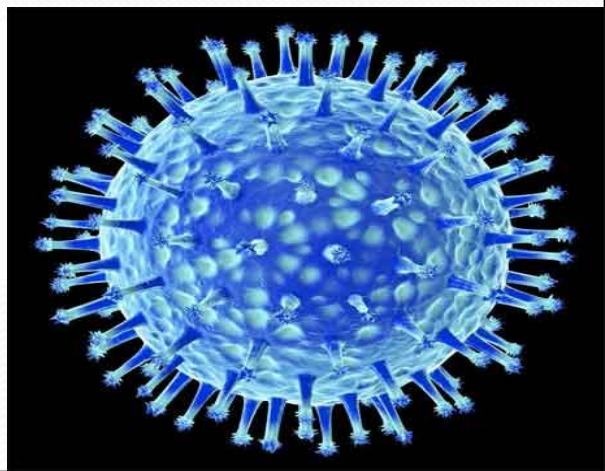
مكتب ٢ ب ٤٥



Cyanobacteria

- Commonly known as blue-green algae, an autotrophic (Photosynthetic).
- Contain chlorophyll a, phycocyanin (blue) and phycoerythrin (red).
- They live in aquatic environments including oceans, ponds, lakes, tidal flats, and moist soil.
- They exist mostly as colonies and filaments and sometimes as single cells.
- Some filamentous forms can move. For example, filamentous forms such as *Oscillatoria sp.* rotate in a screw like manner.

Cyanobacteria

- **Produce gelatinous capsules which are often lighter than water and therefore help keep the algae up near the surface of the water .**
- **Reproduction in by fission only, a prokaryotic cell.**
- **Lack chlorophyll *b.* The photosynthetic product is stored in their own form of starch, which is similar to animal glycogen.**

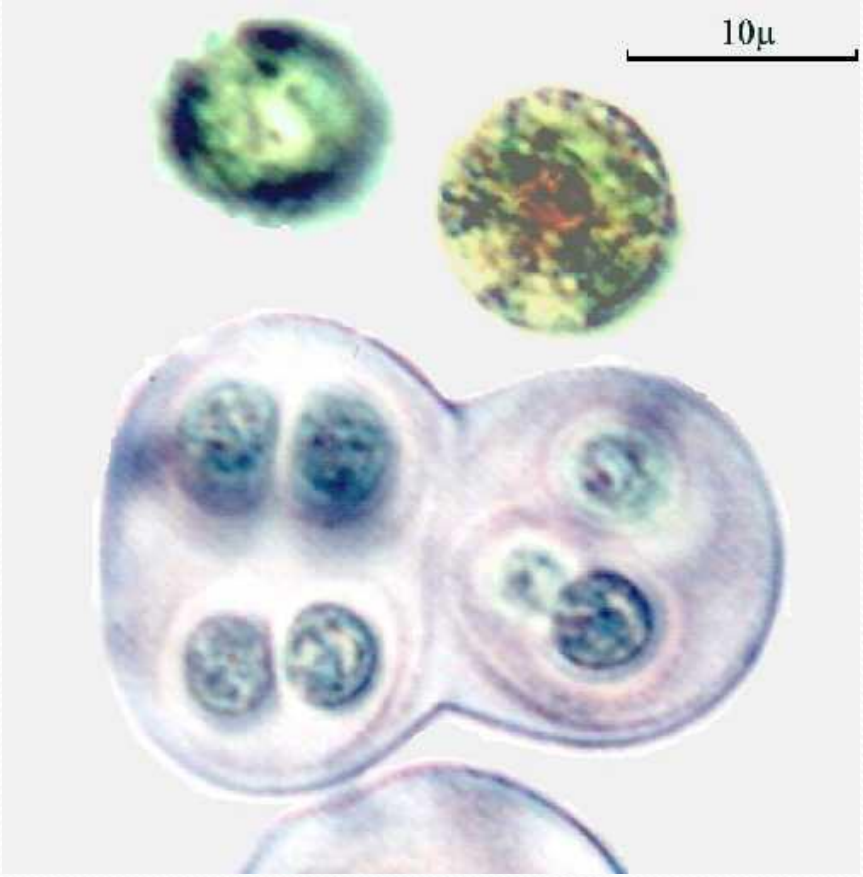
اشكال السيانوبكتيريا

Forms of Cyanobacteria

- Unicellular or aggregate.

e.g.

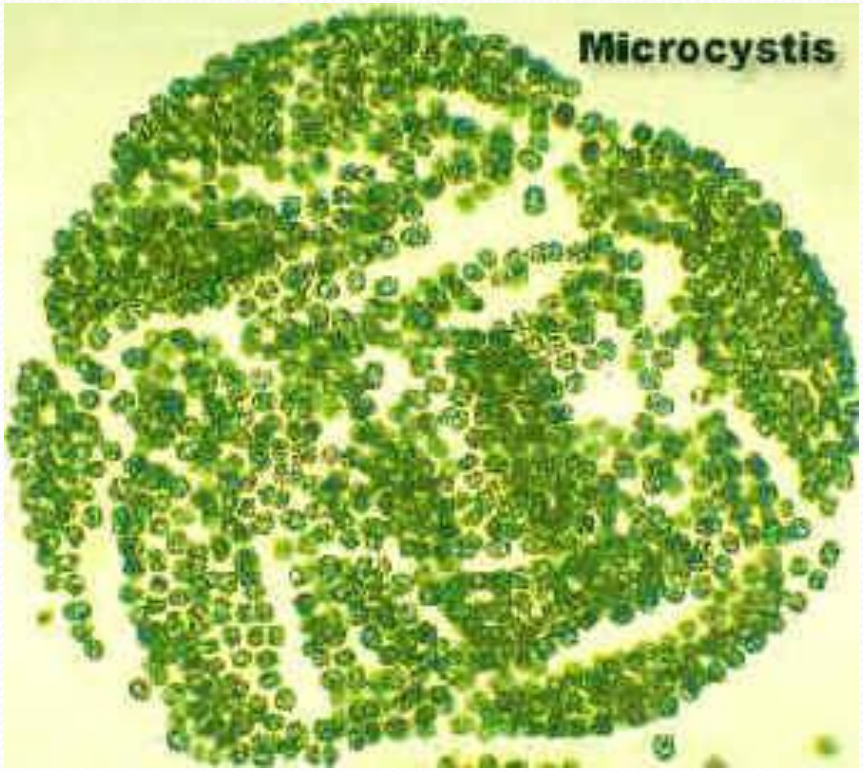
Gloeocapsa sp



2. Colony

e.g.

Microcystis sp

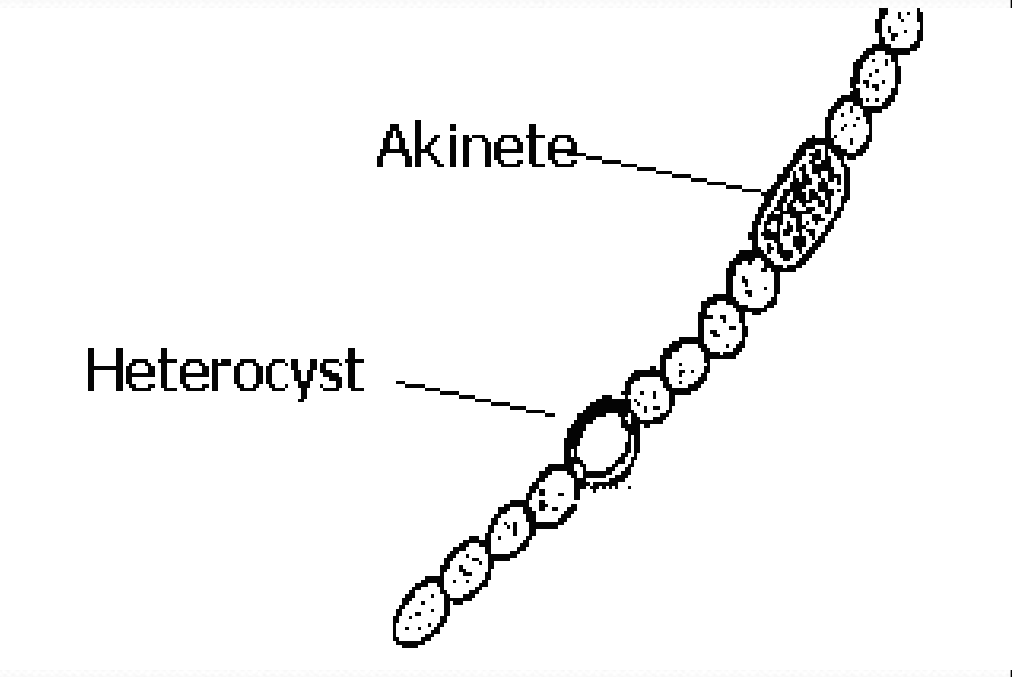


3. Filamentous forms

a). Un-branched

e.g.

Anabaena sp

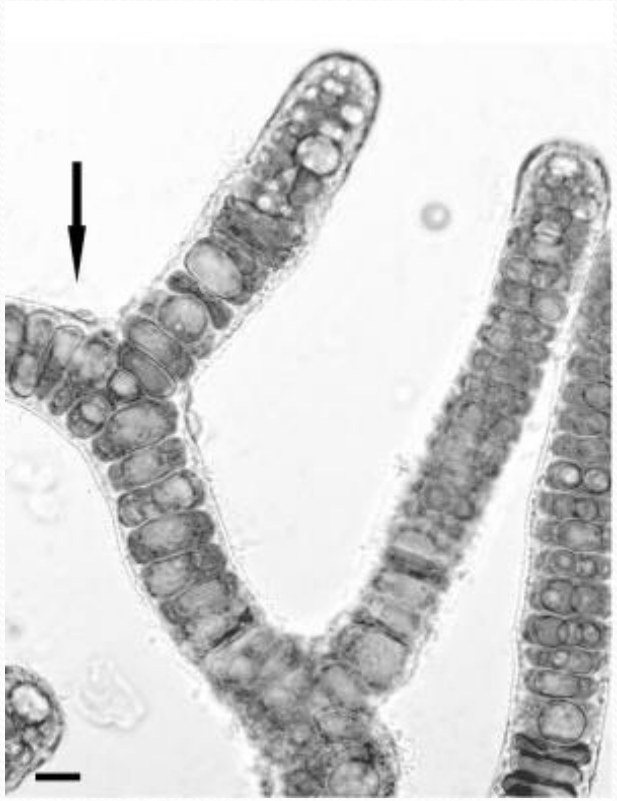


3. Filamentous forms

b). Branched

e.g.

Stigonema sp.

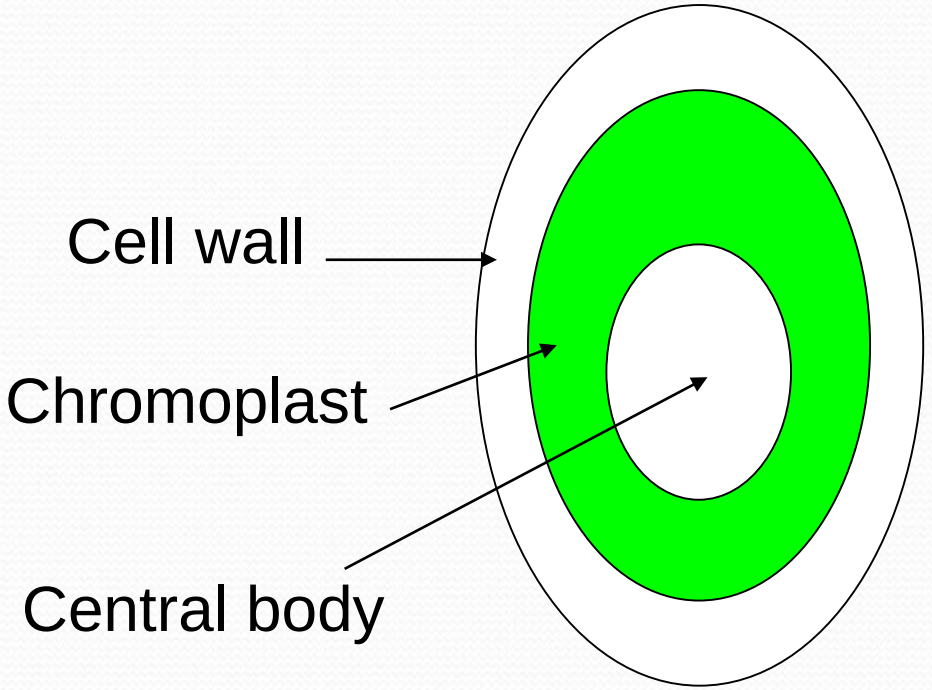


Cell Structure

- The cell structure is very primitive.
- Each cell is composed of two parts:
  - Cell Wall.
  - Protoplast.
- The cell wall is composed of 2 layers:

The inner layer of which is thin and firm composed of cellulose.

The outer layer of the wall is thicker and gelatinous known as the sheath and mainly constituted of pectic compounds.

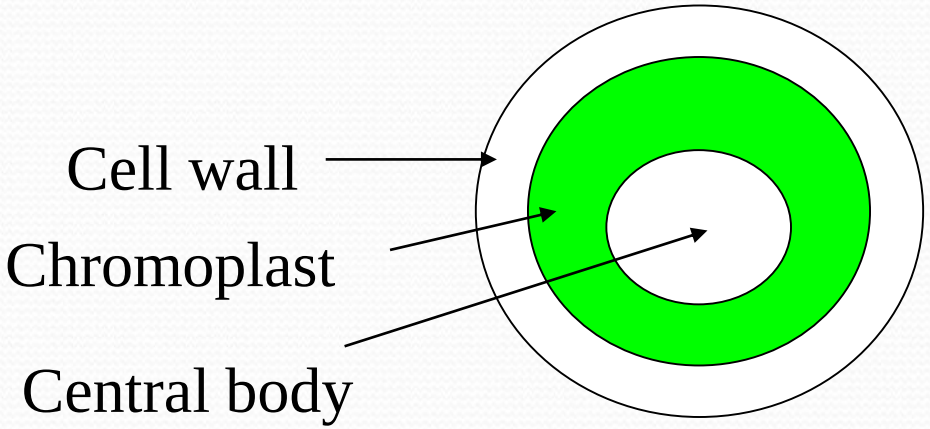


Cell Structure

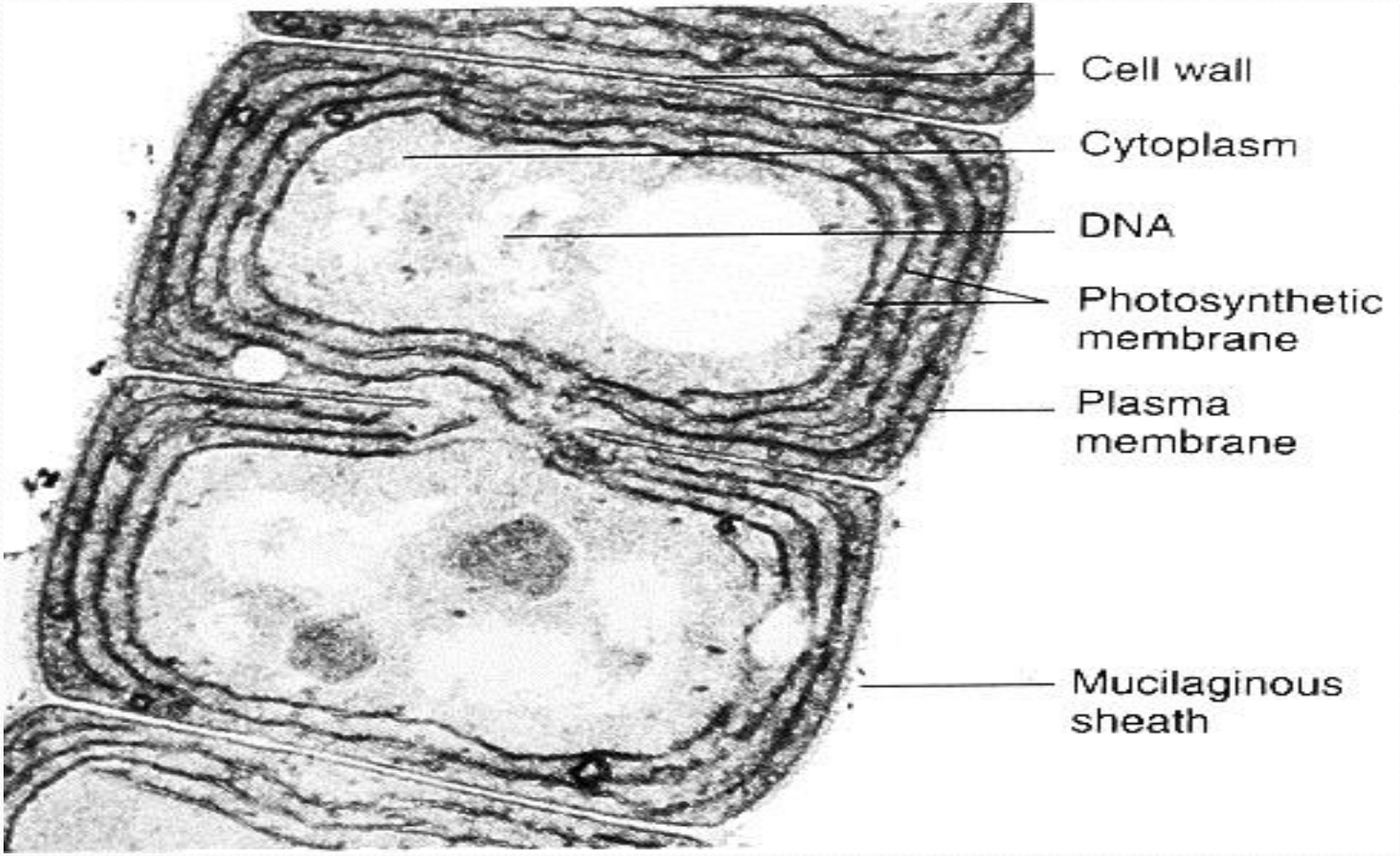
-The protoplast consists of 2 parts:

peripheral pigmented (coloured) region surrounding a colourless central region**.** It contains the blue pigment “phycocyanin” together with “chlorophyll” and known as “chromoplasm”.

The colourless inner region (central body) contains several chromatin granules (DNA) which represent a primitive type of nucleus that lacks nuclear membrane and nucleoli

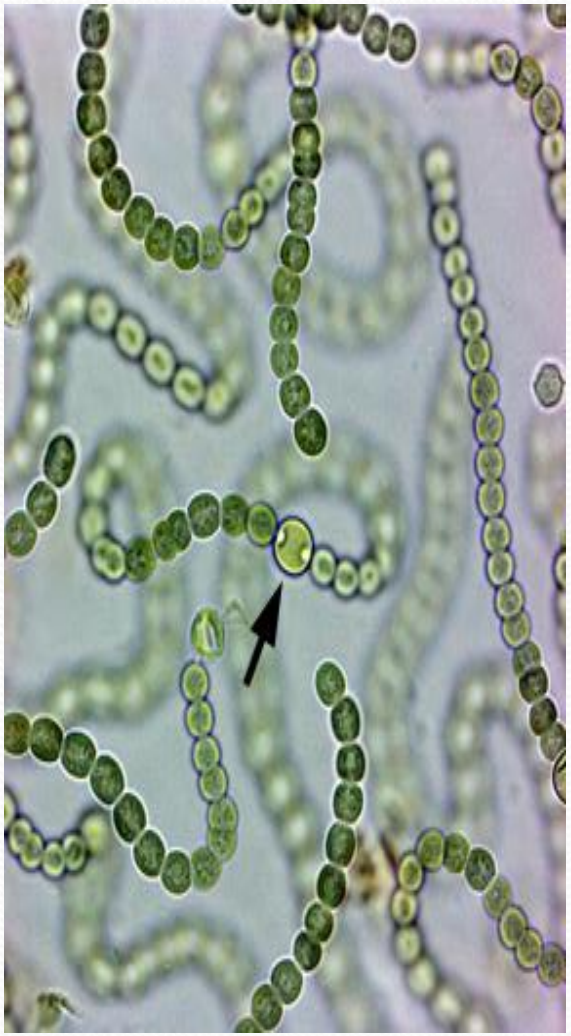


Cyanobacterial cell

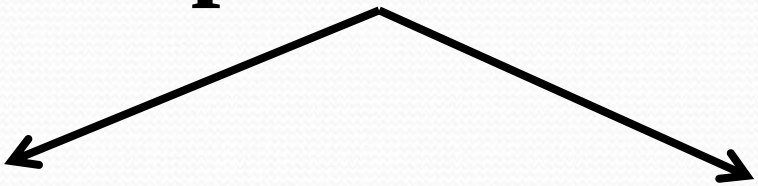


Nostoc

- Grows in water and on damp soils.
- Un-branched filaments with barrel-like cells.
- Certain enlarged cells appear at intervals, which are known as heterocysts . Its transparent and thick walls.
- The whole filament is surrounded with gelatinous material.
- Each two heterocysts delimit in between , a number of cells called hormogonia.
- In most cases clusters of filaments are grouped together in the form of gelatinous masses.



Reproduction

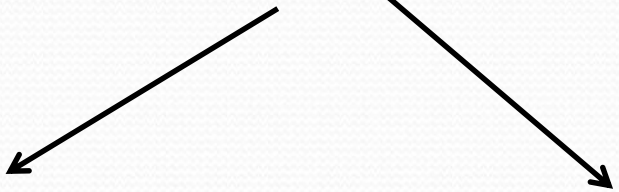


التكاثر الخضري

Vegetative reproduction.

التكاثر اللاجنسي

Asexual reproduction.



By fission.

الانشطار

By Akinetes.

الأكينيتات

Vegetative reproduction.

By fragmentation

Filament → breaks into fragments.

Each → gives rise to → a new filament.

Usually fragmentation occurs at the heterocysts

This fragment is capable of creeping movements in the gelatinous sheath until it escapes and grows into a new filament.

Asexual Reproduction

- By fission.

A constriction is formed in the middle of the cell

extends from the surface inwards towards the center

Division into two cells

leads to the increase in number of cells per filament without production of a new one.

- **By Akinetes**

vegetative cells

↓

enlarge in size

↓

become rich in food materials and form a thick wall

↓

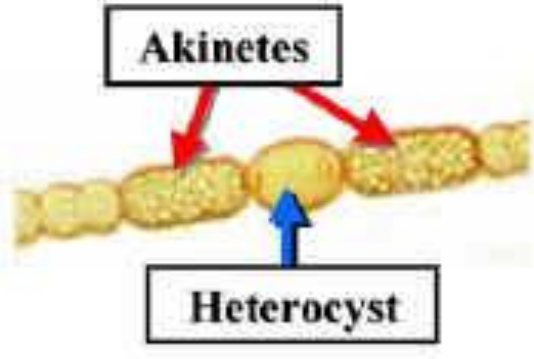
These akinetes are yellow or brown in color and they are very resistant to un-favorable conditions

↓

When the conditions are favorable

↓

the akinetes germinate into new filaments.



QUESTIONS??