



PHYLUM CYANOPHYTA

COMMON NAMES

A microscopic image of cyanophytes, showing several parallel chains of spherical cells. Each cell contains a central, darker spot, likely a nucleoid. One cell in each chain is significantly larger and lighter in color, representing a heterocyst. The chains are arranged in a somewhat regular, parallel fashion against a light green background.

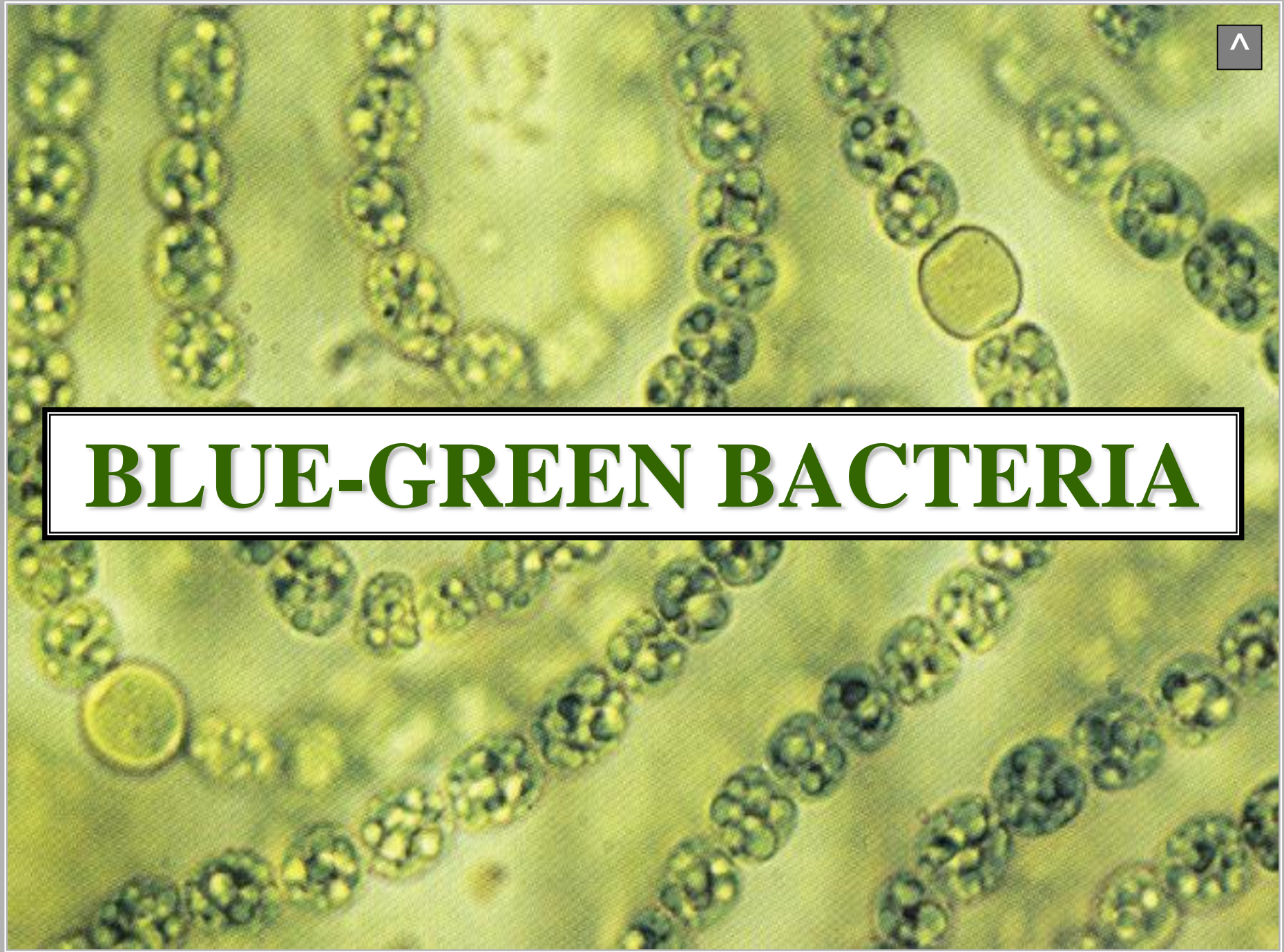
CYANOPHYTES

A microscopic image showing several chains of cyanobacteria. The chains are composed of small, spherical cells, some of which are larger and more distinct than others. The overall color is a pale greenish-yellow. A white rectangular box with a black border is superimposed over the center of the image, containing the word 'CYANOBACTERIA' in green, bold, serif capital letters.

CYANOBACTERIA



BLUE-GREEN BACTERIA





DIVERSITY

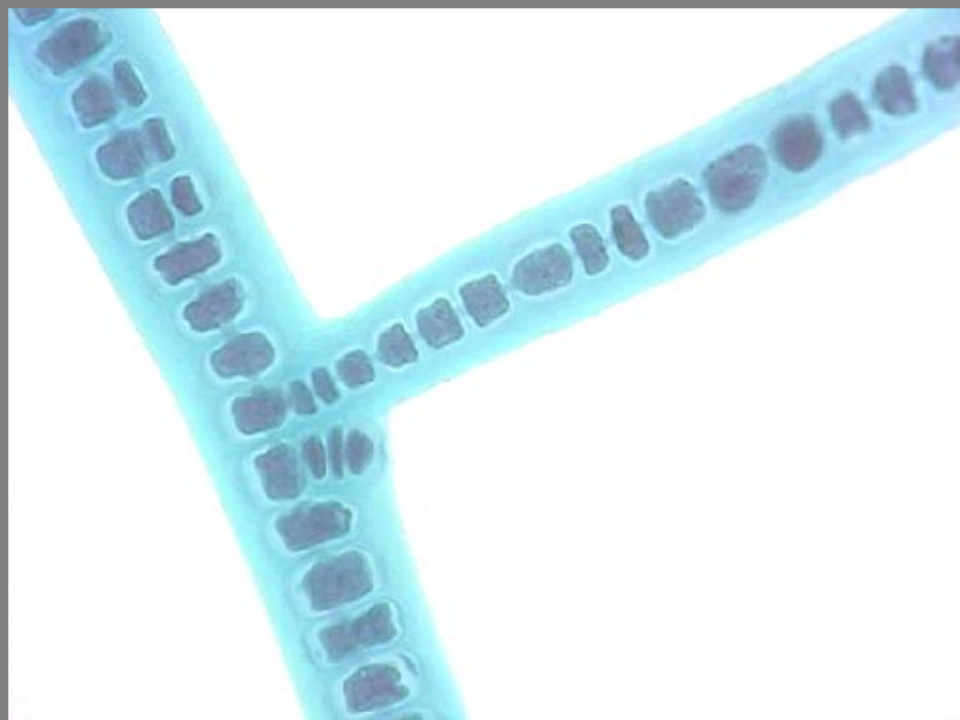
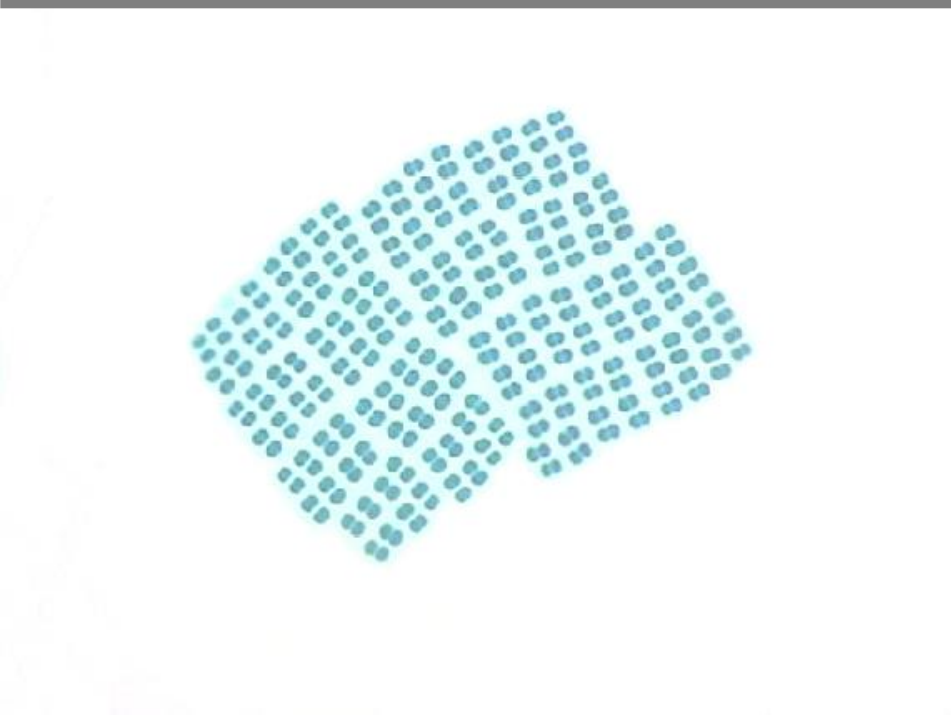
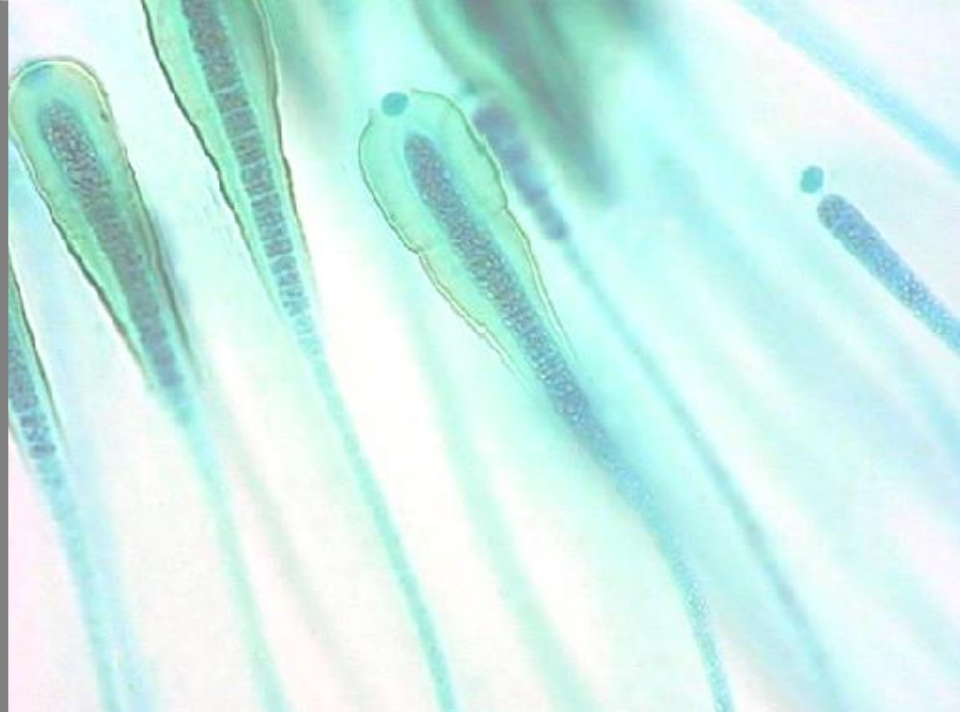
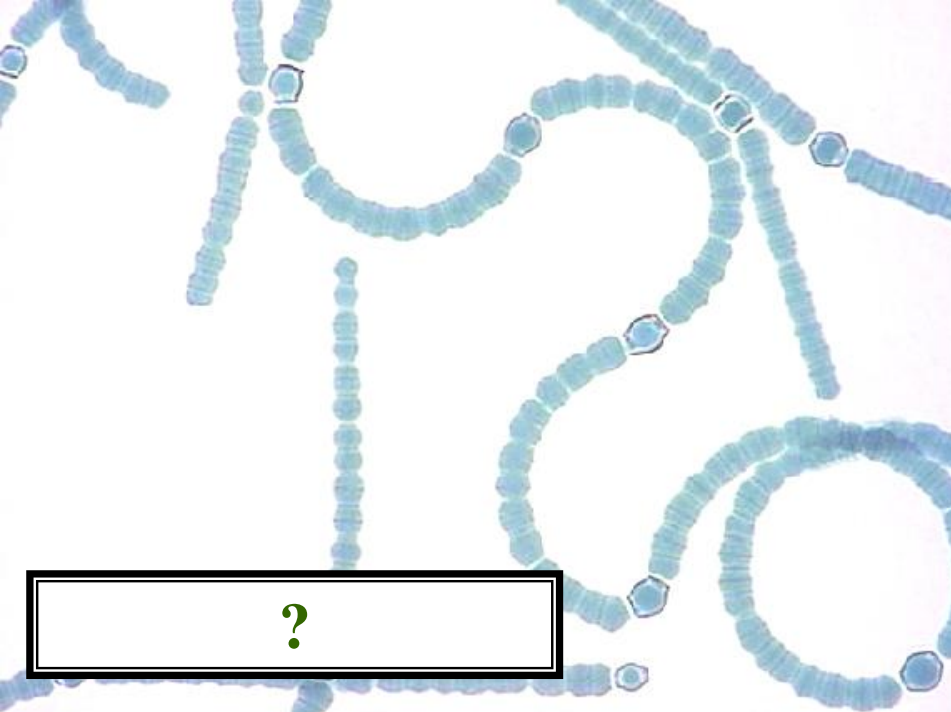
~200 SPECIES

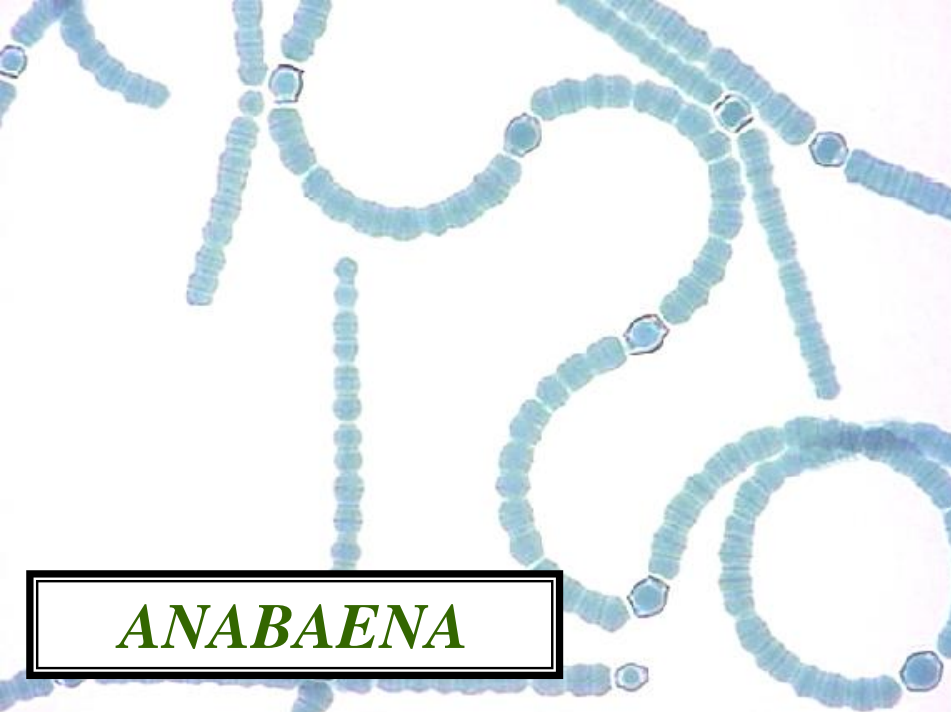
EARTH



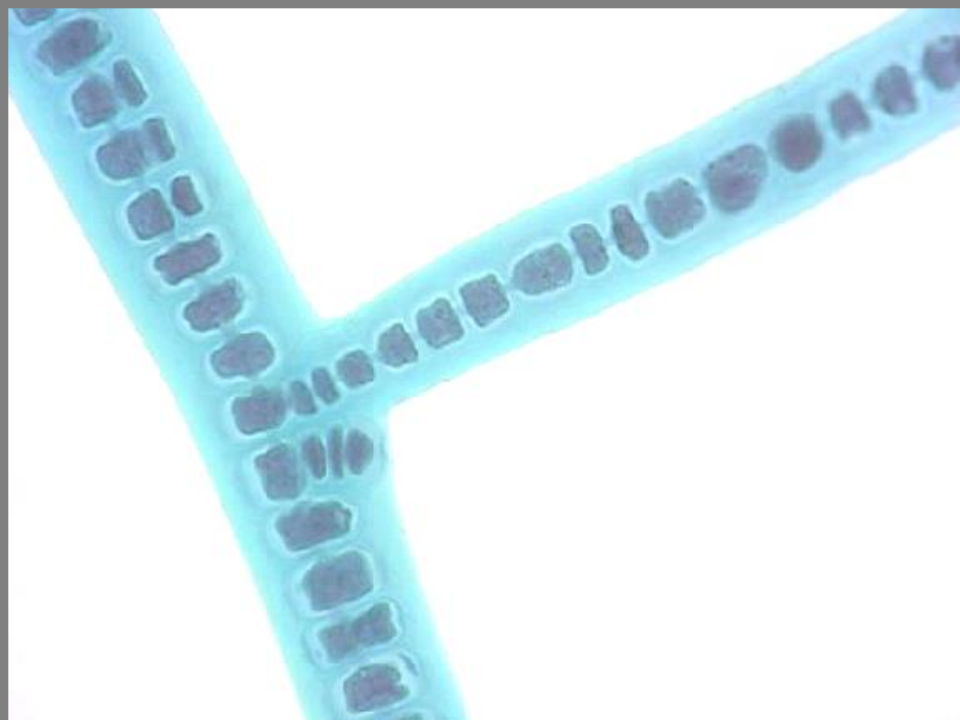
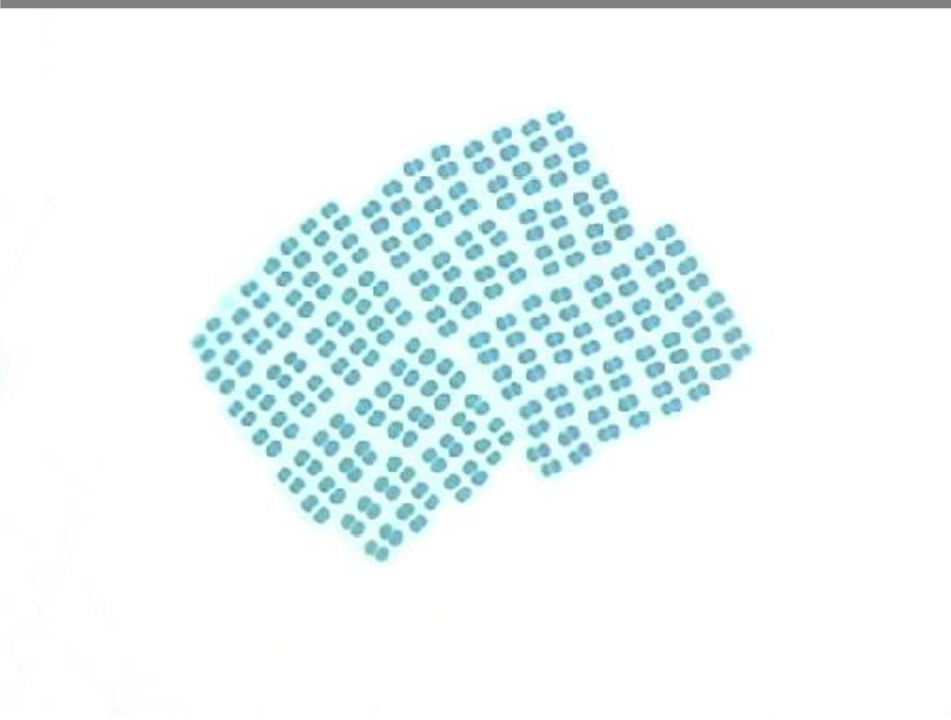
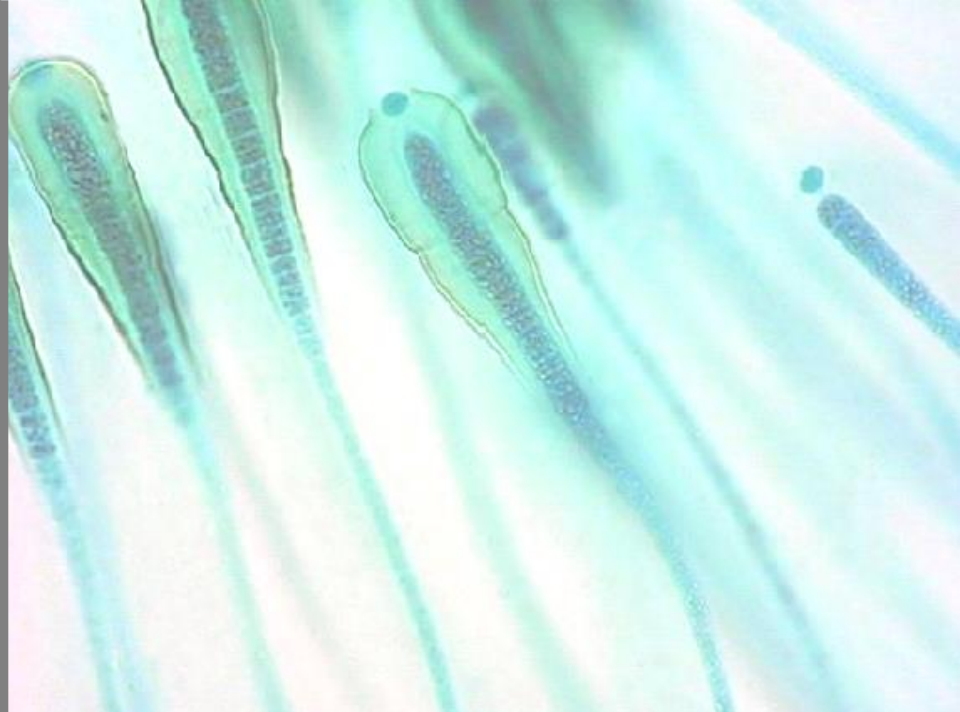
~15 GENERA

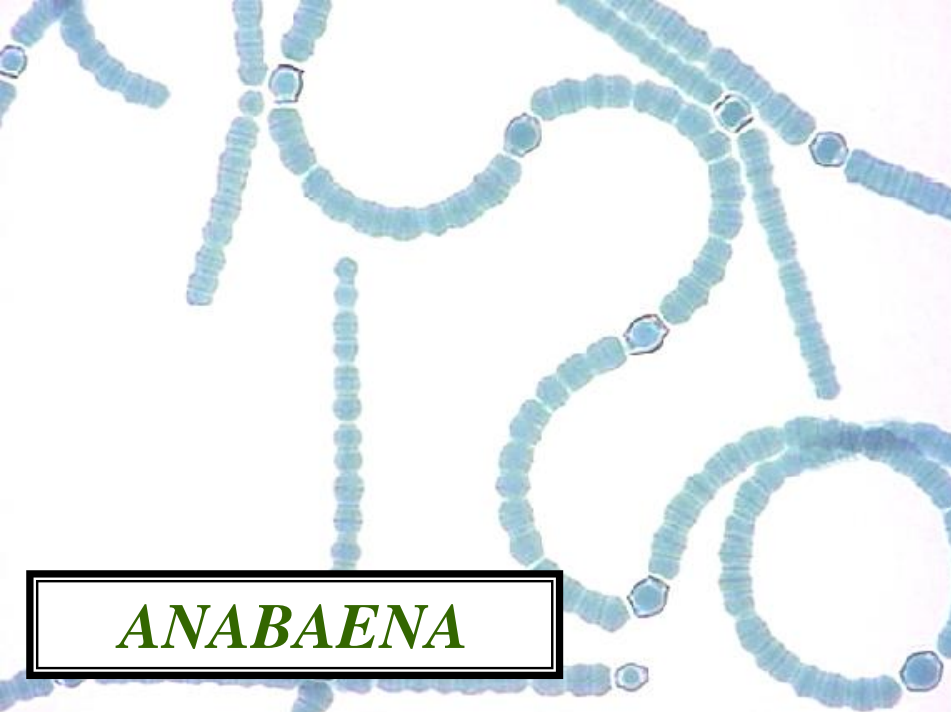
EARTH



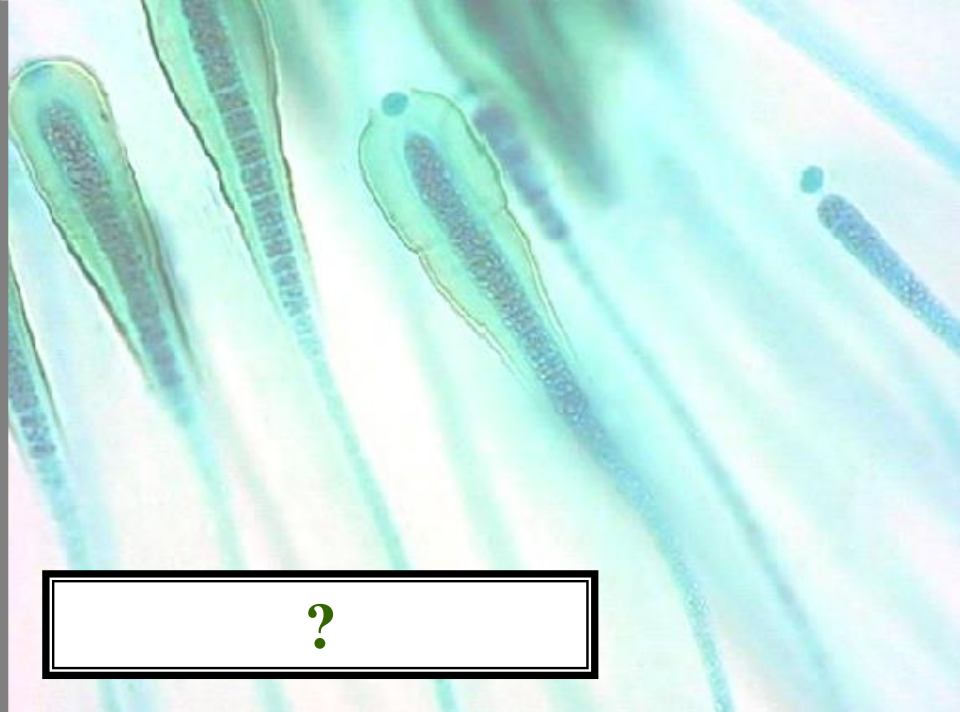


ANABAENA

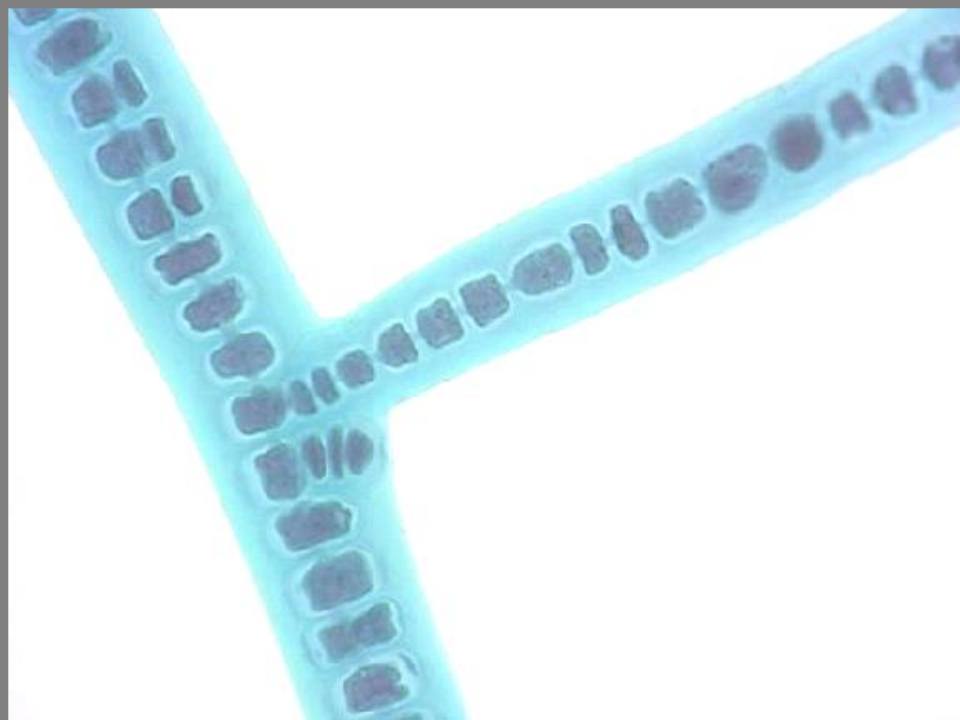
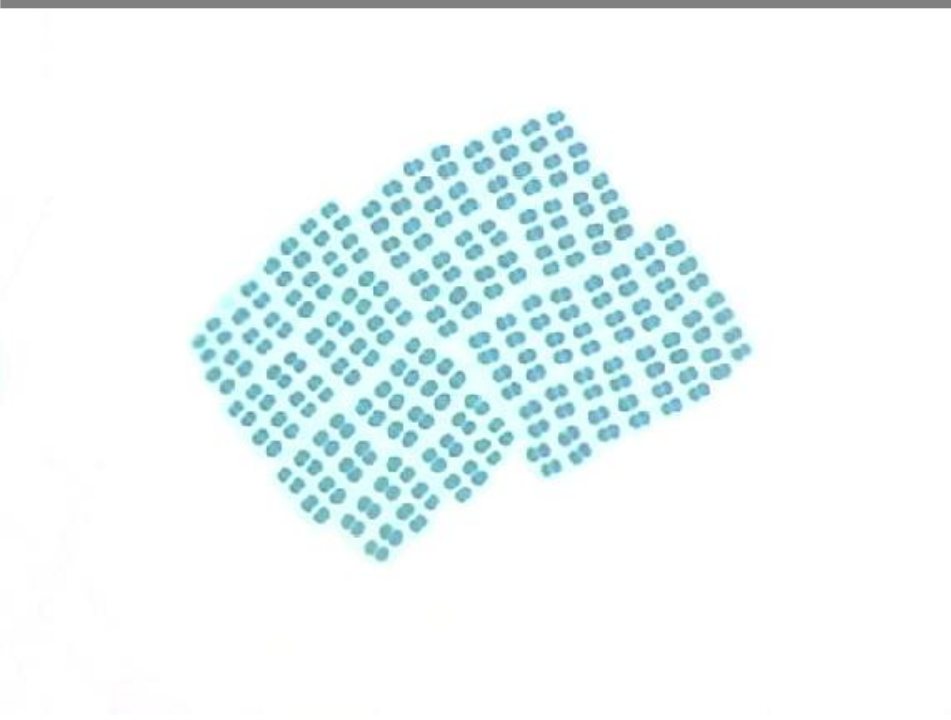


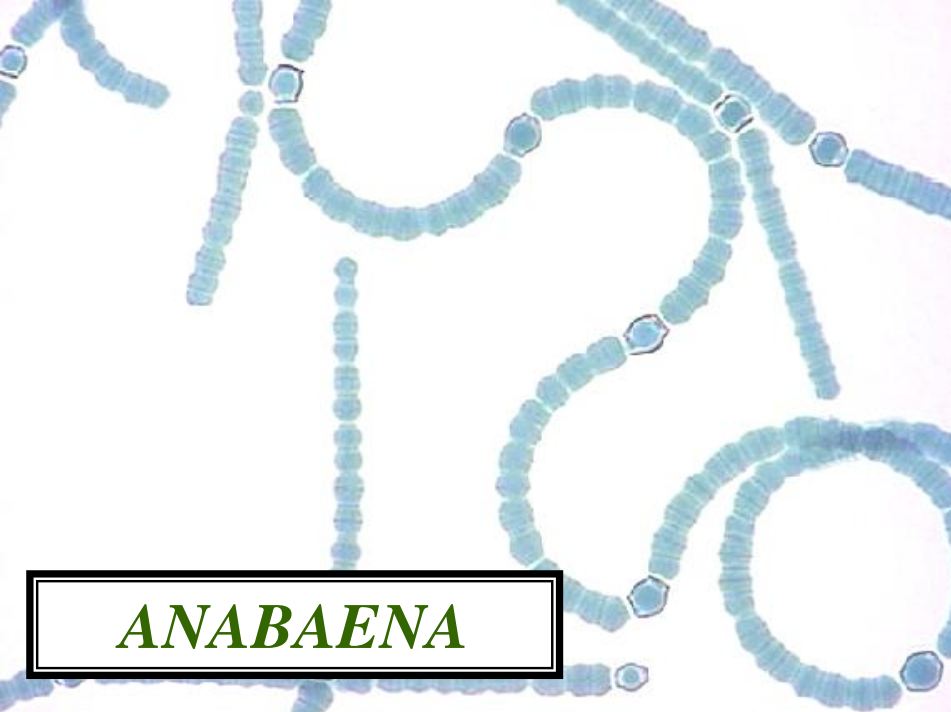


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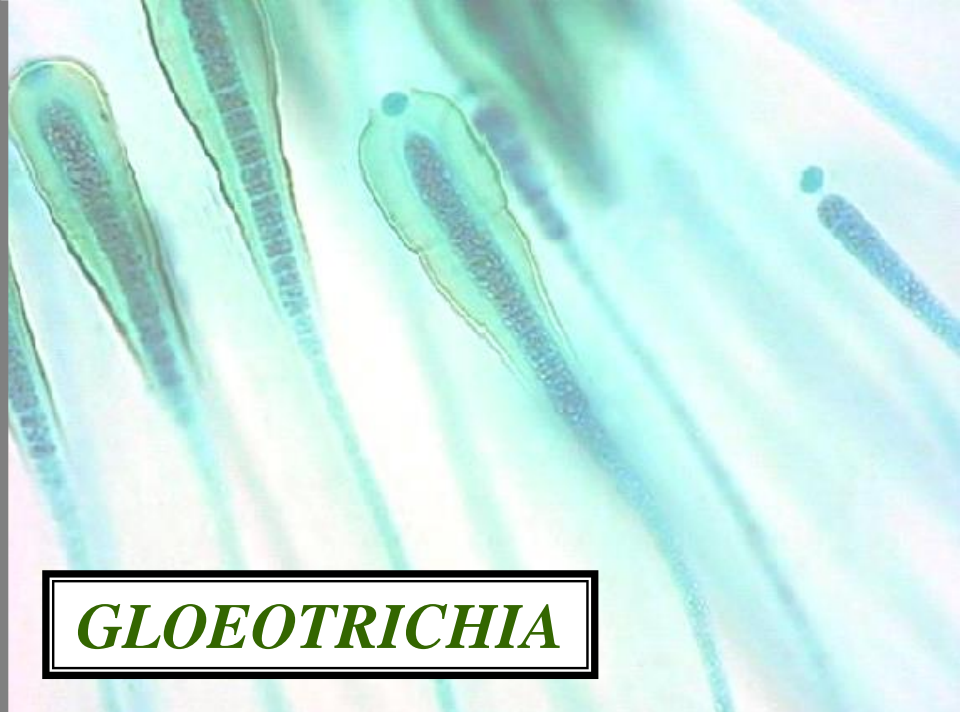


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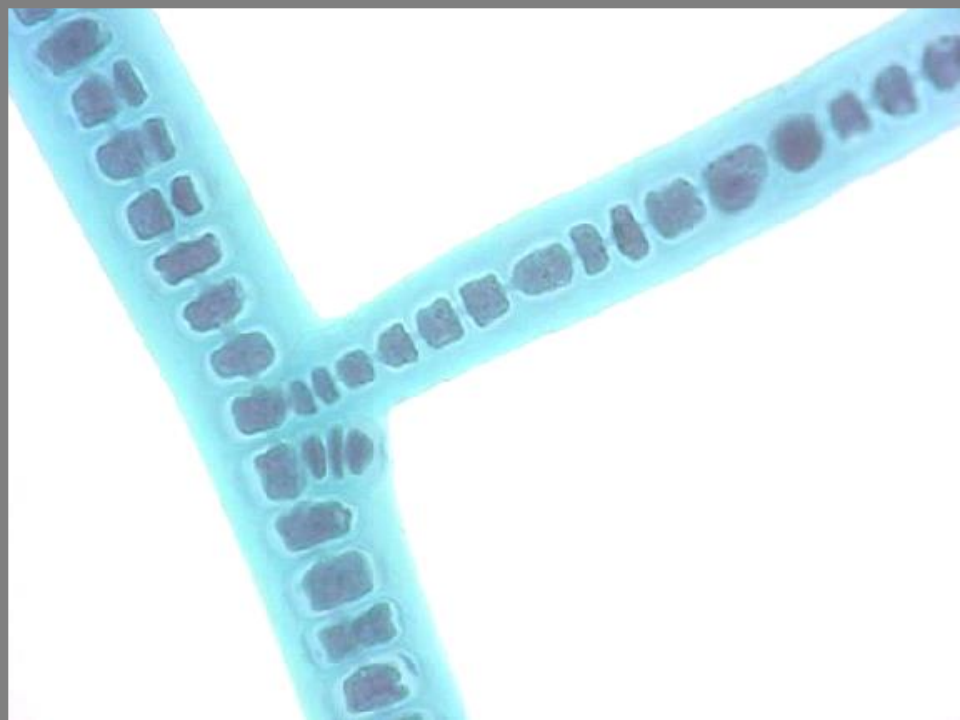
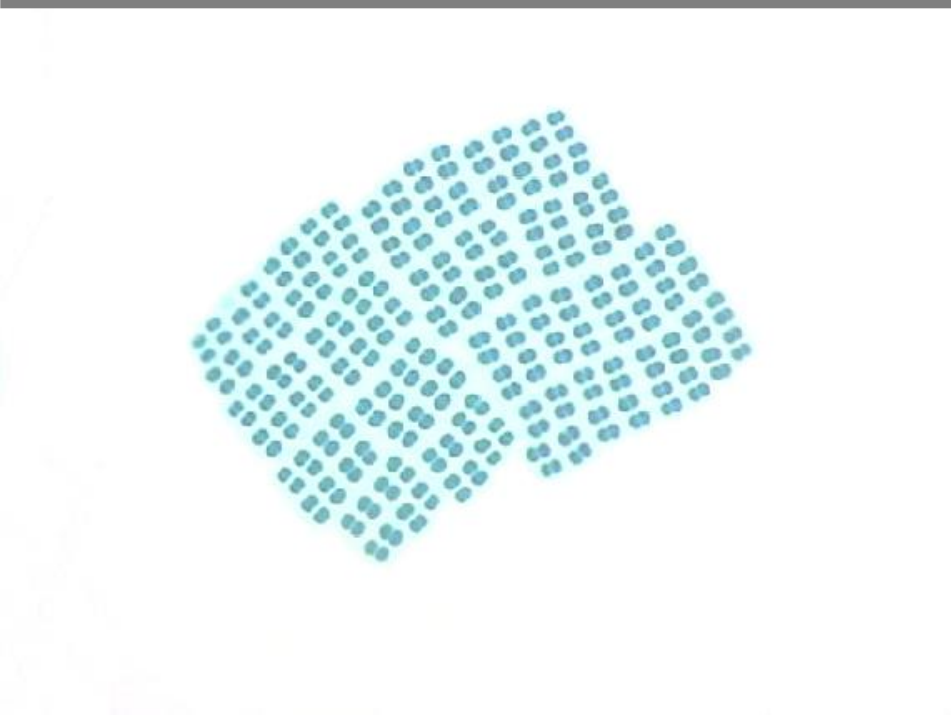


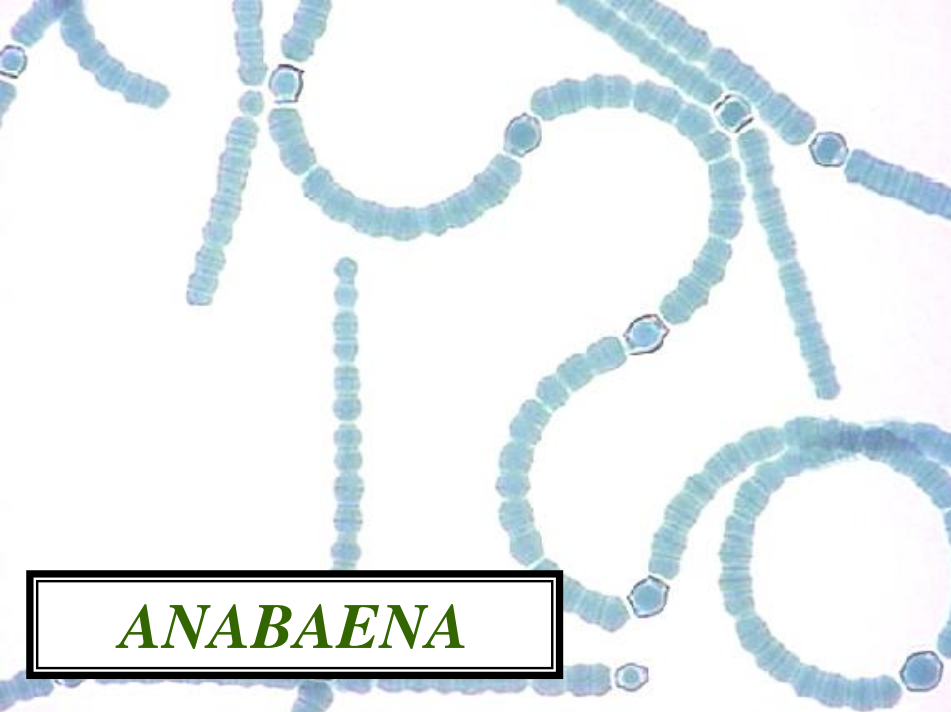


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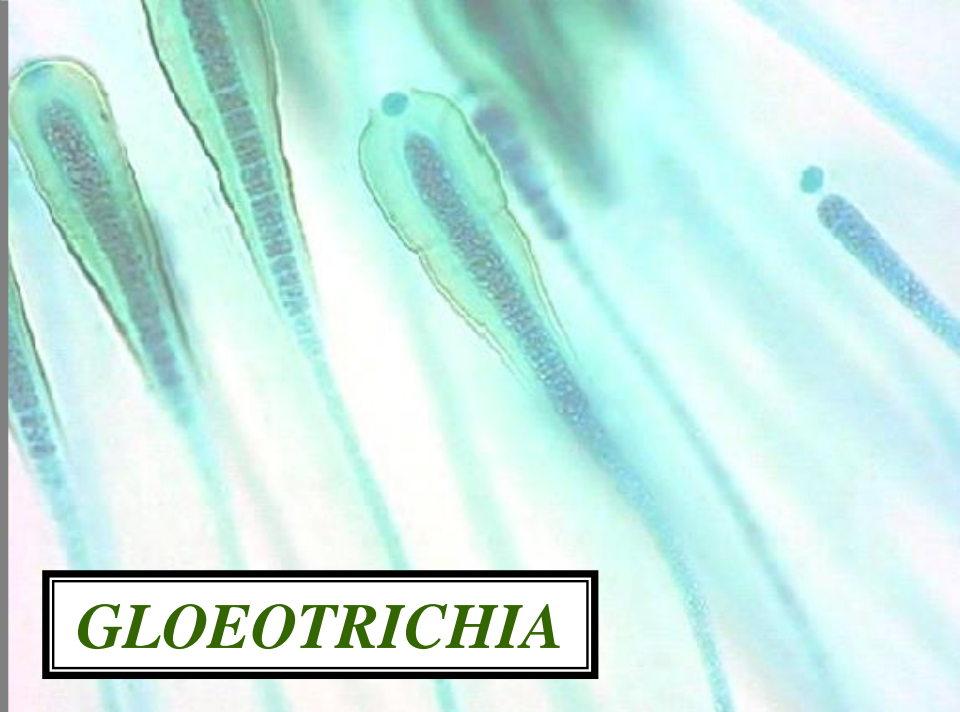


GLOEOTRICHIA

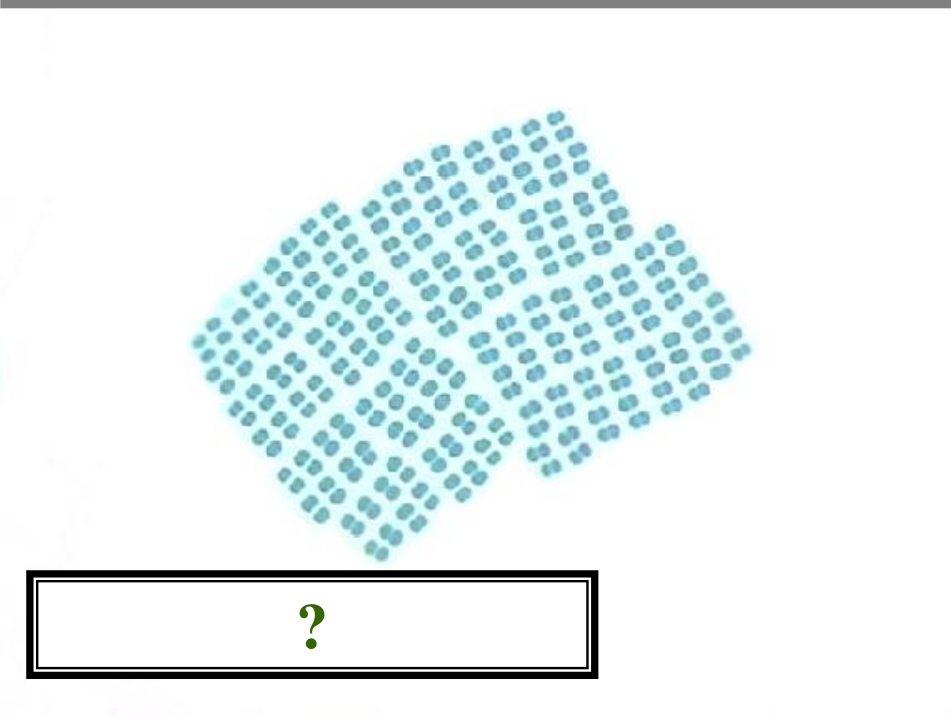




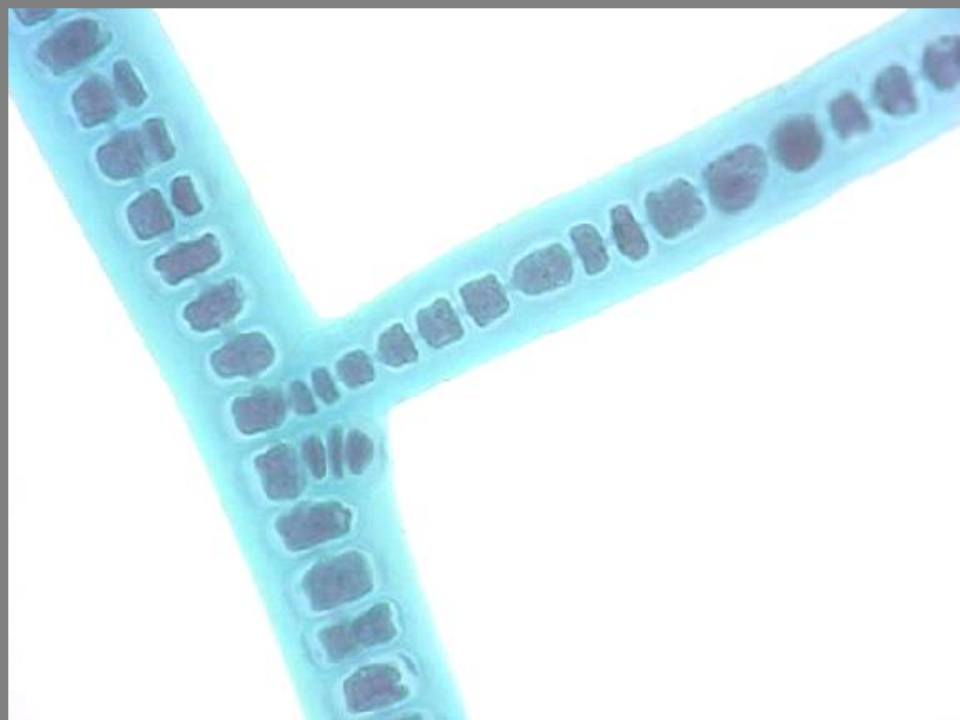
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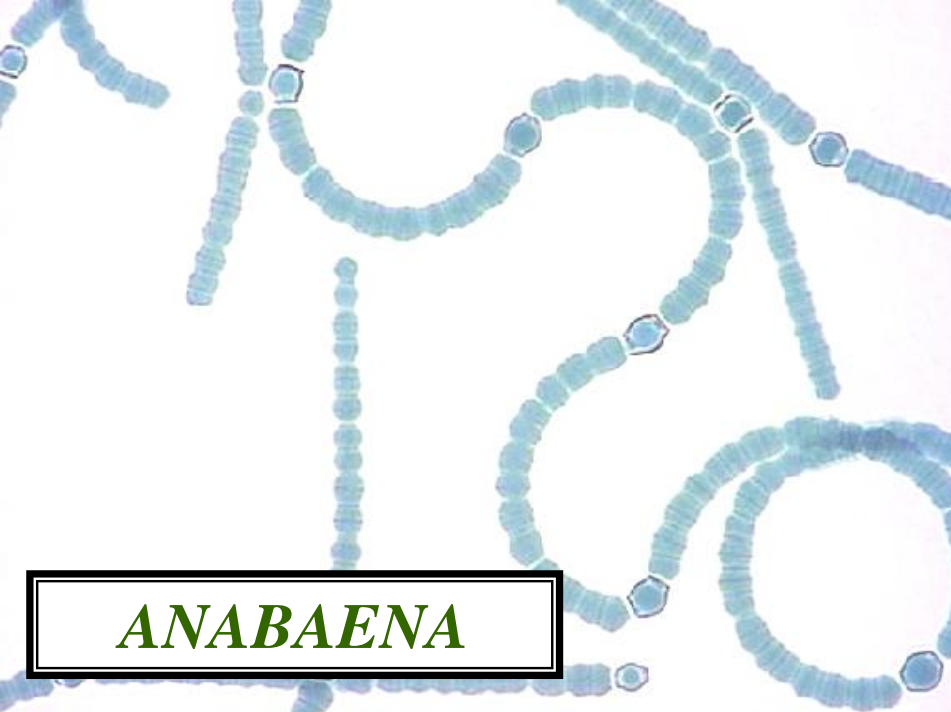


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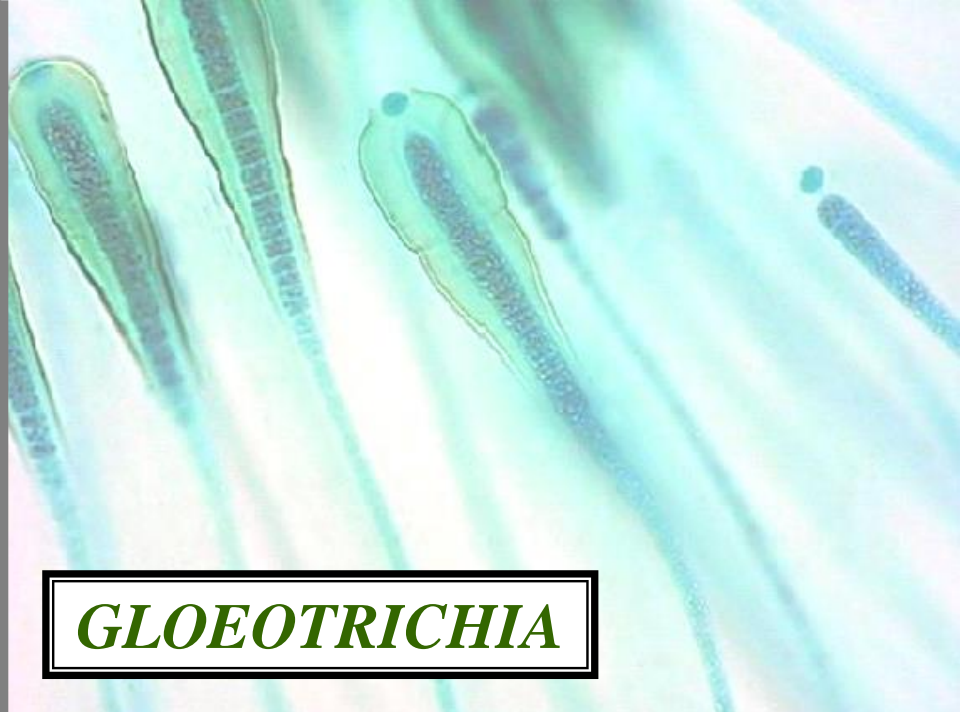


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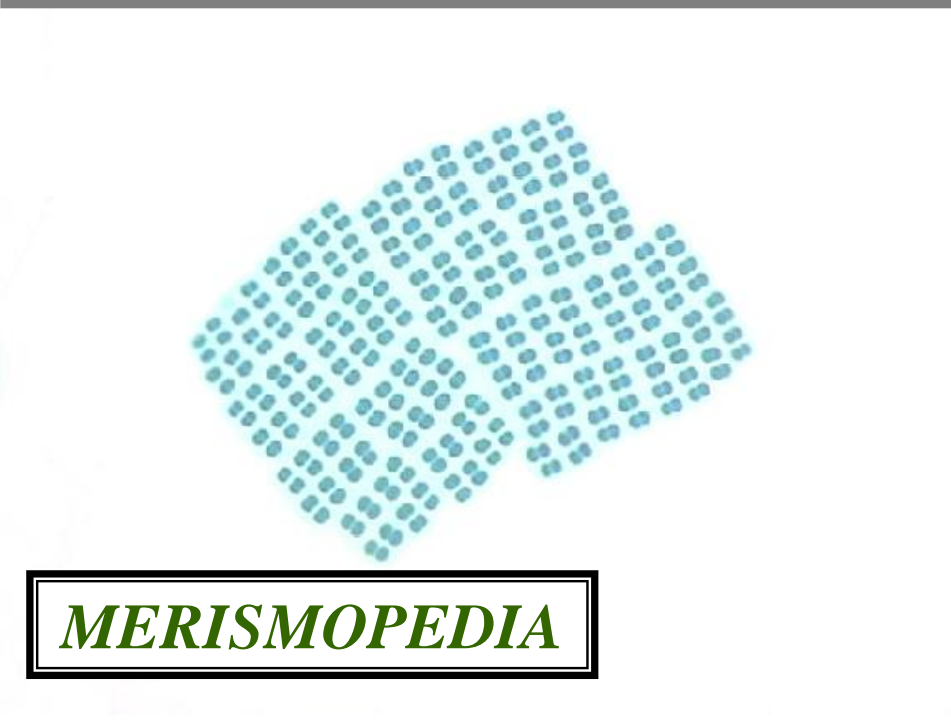




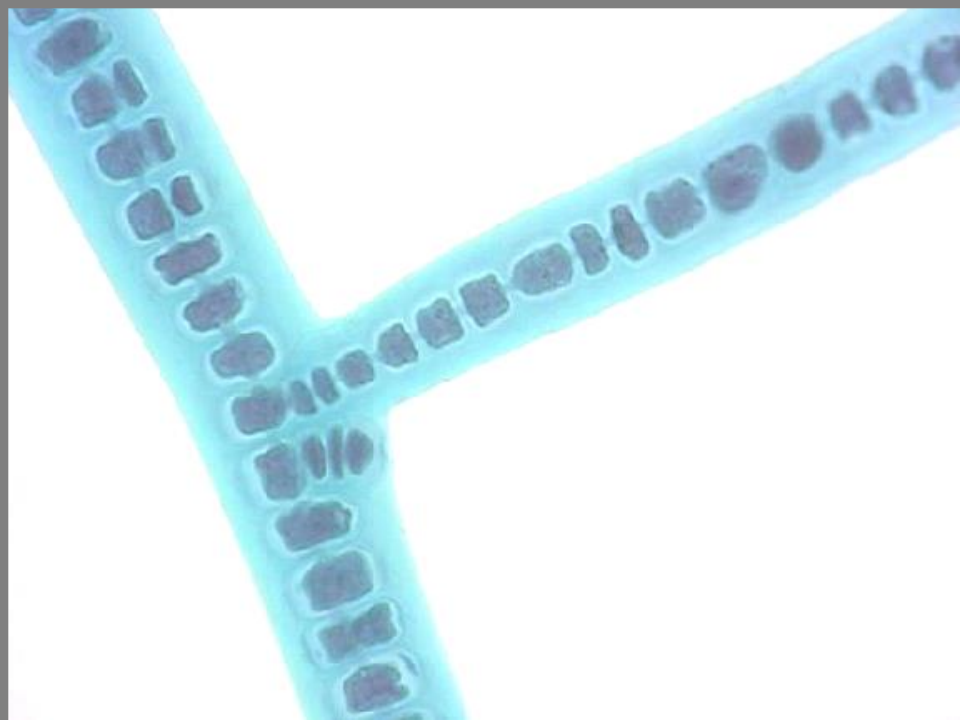
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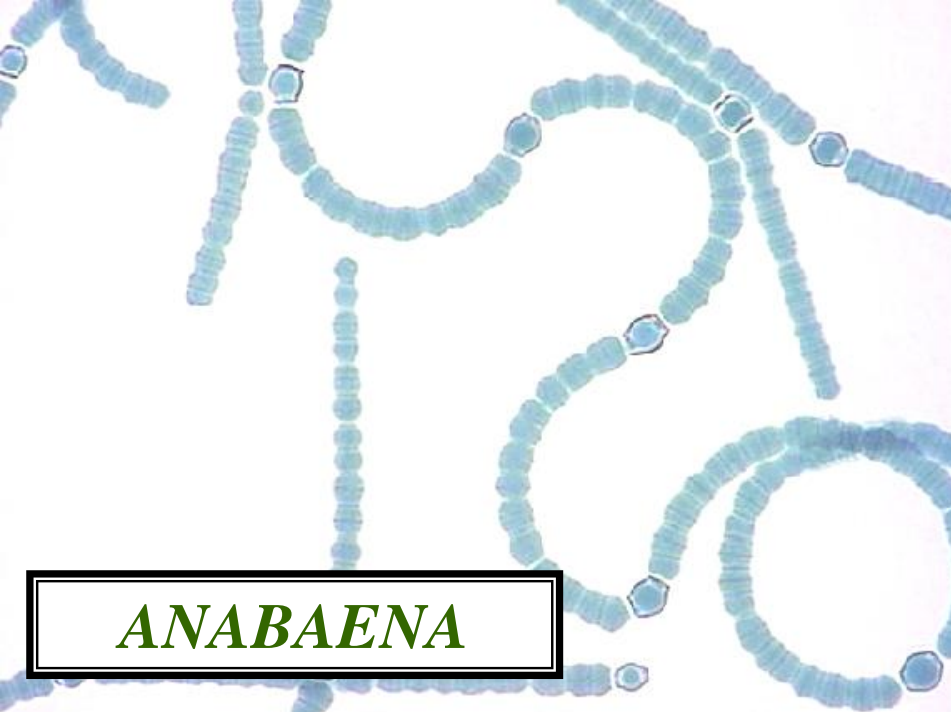


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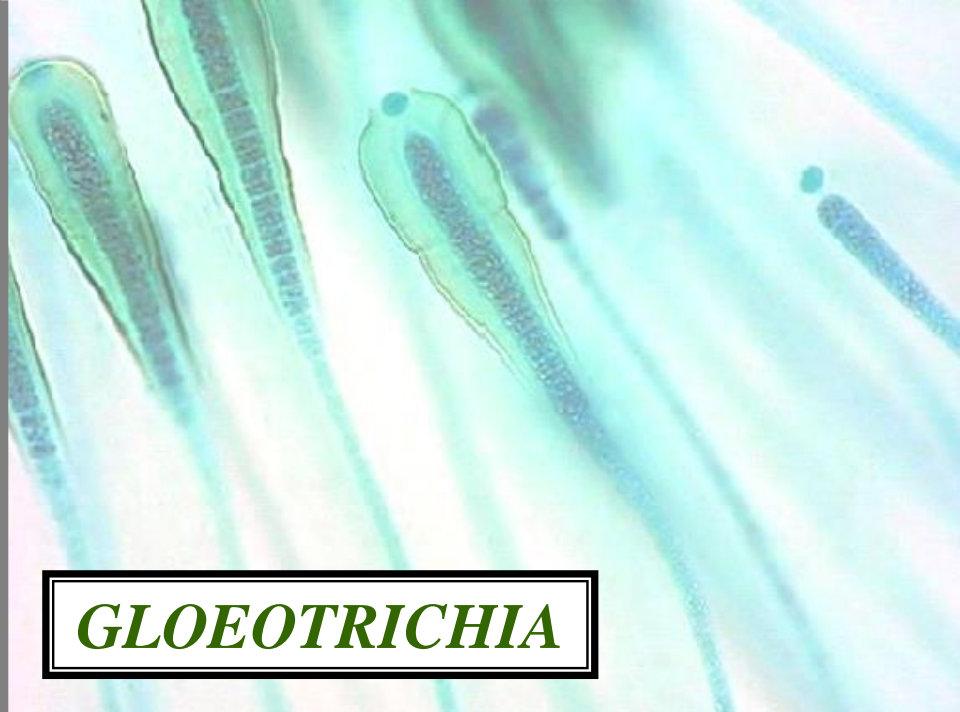


MERISMOPIEDIA

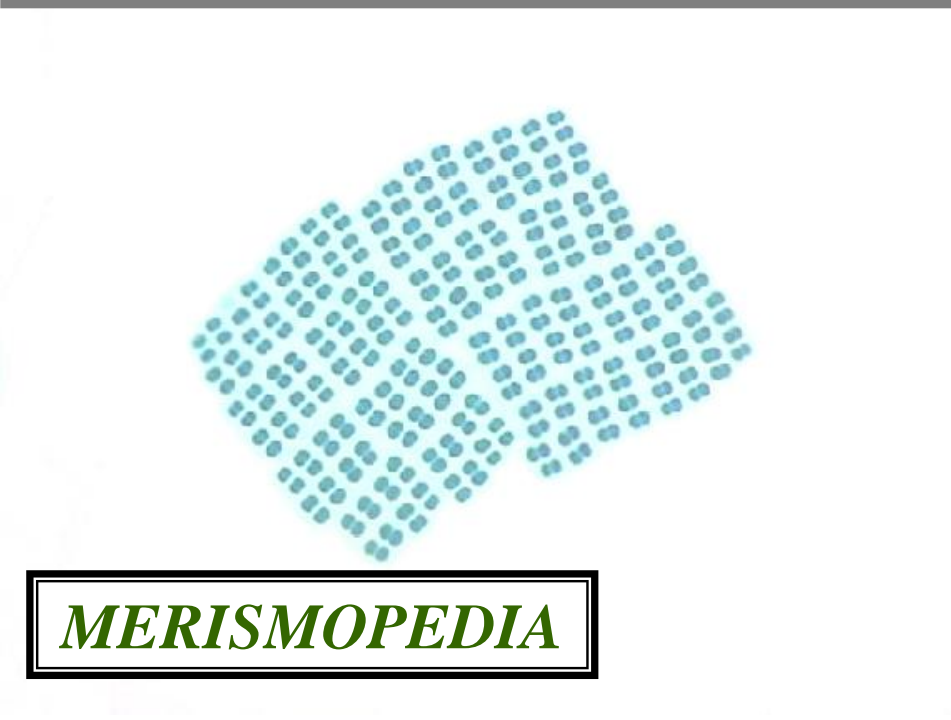




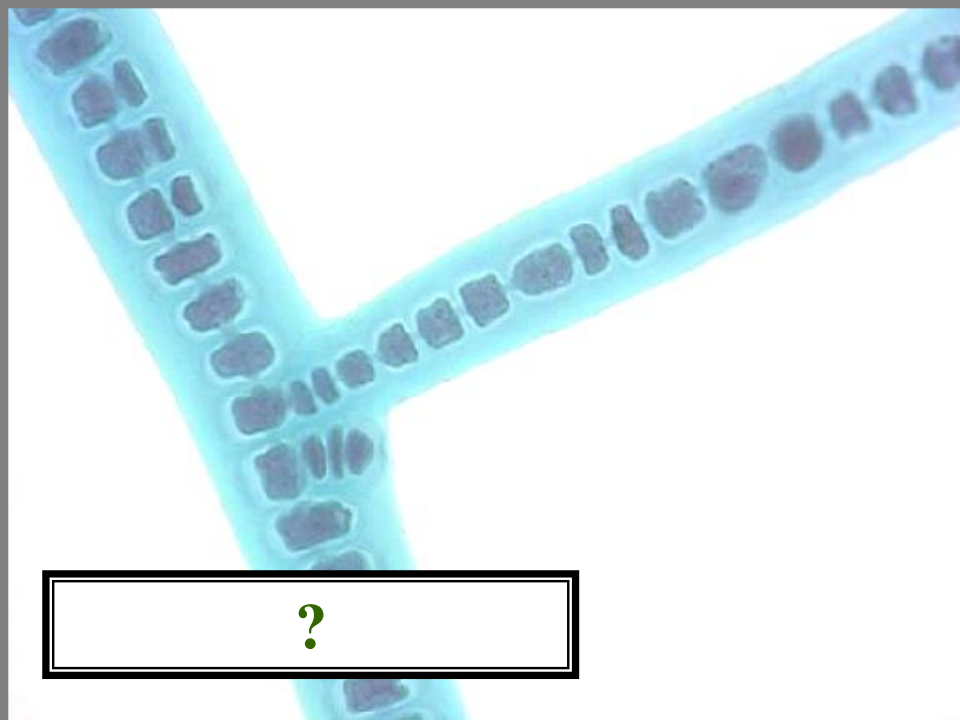
ANABAENA



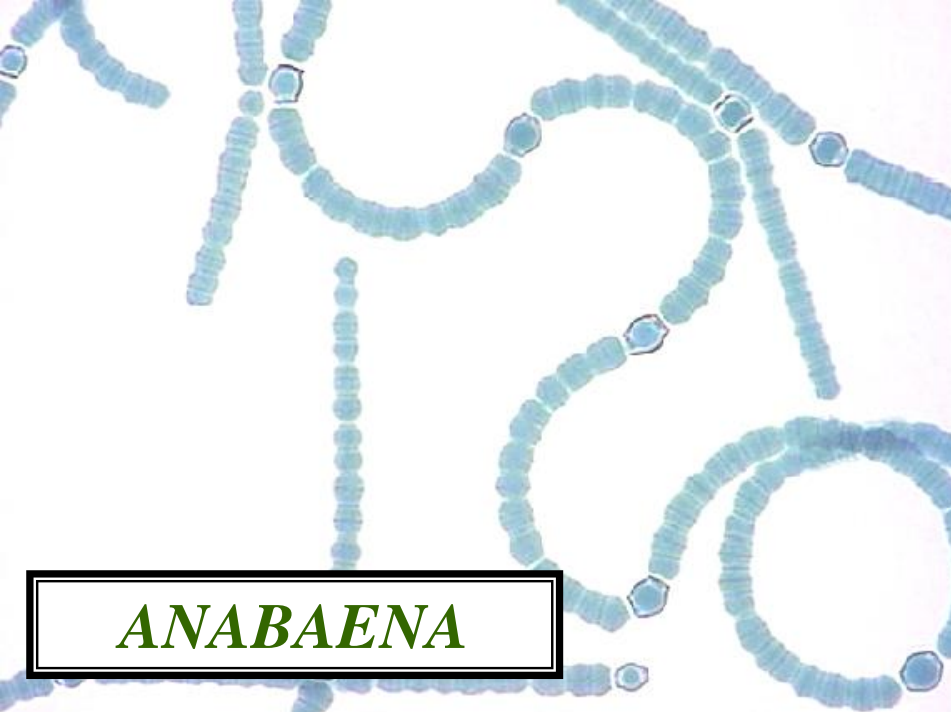
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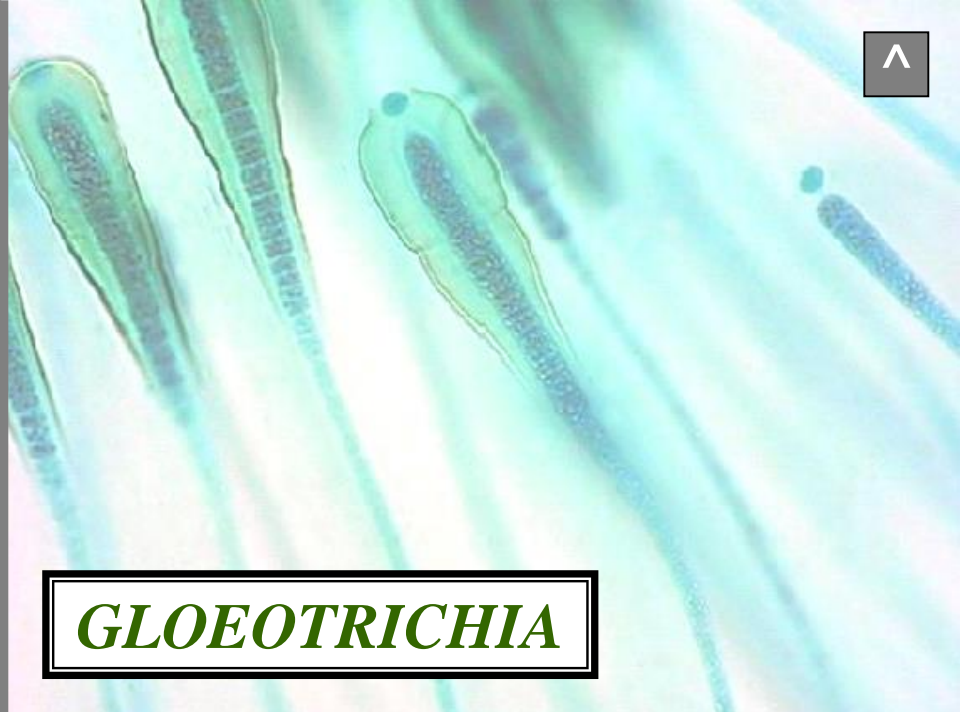
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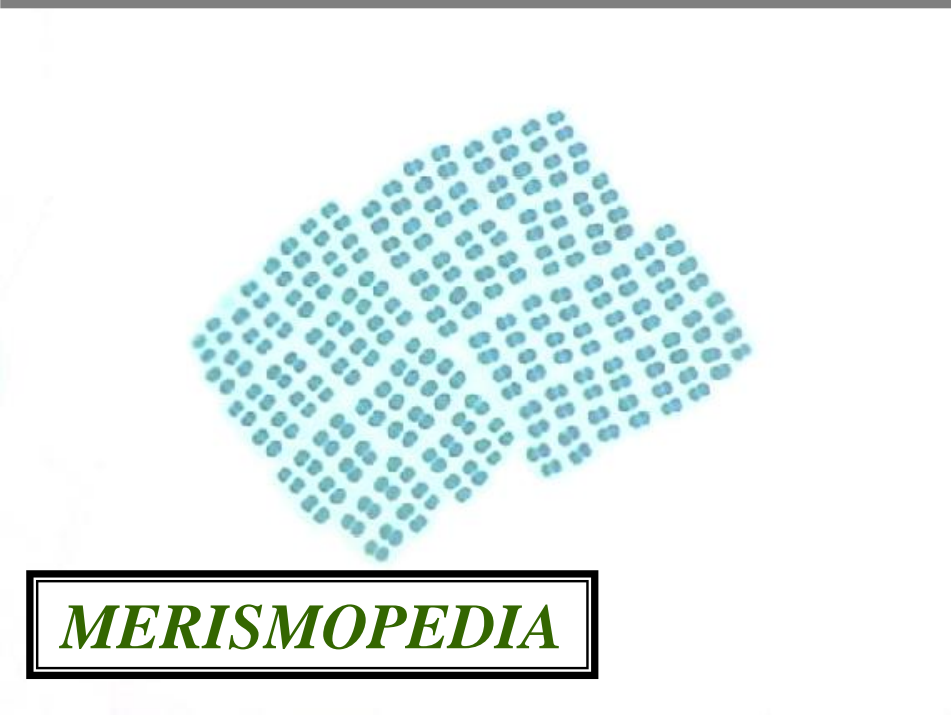
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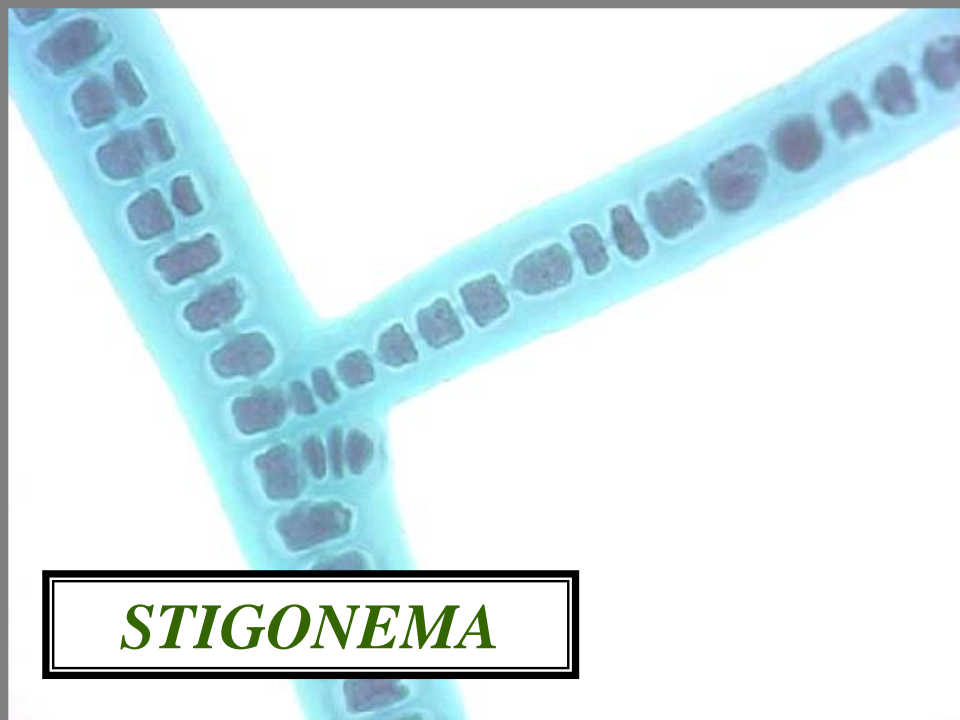
ANABAENA



GLOEOTRICHIA



MERISMOPEDIA



STIGONEMA



DISTRIBUTION



COSMOPOLITAN

EARTH



HABITAT

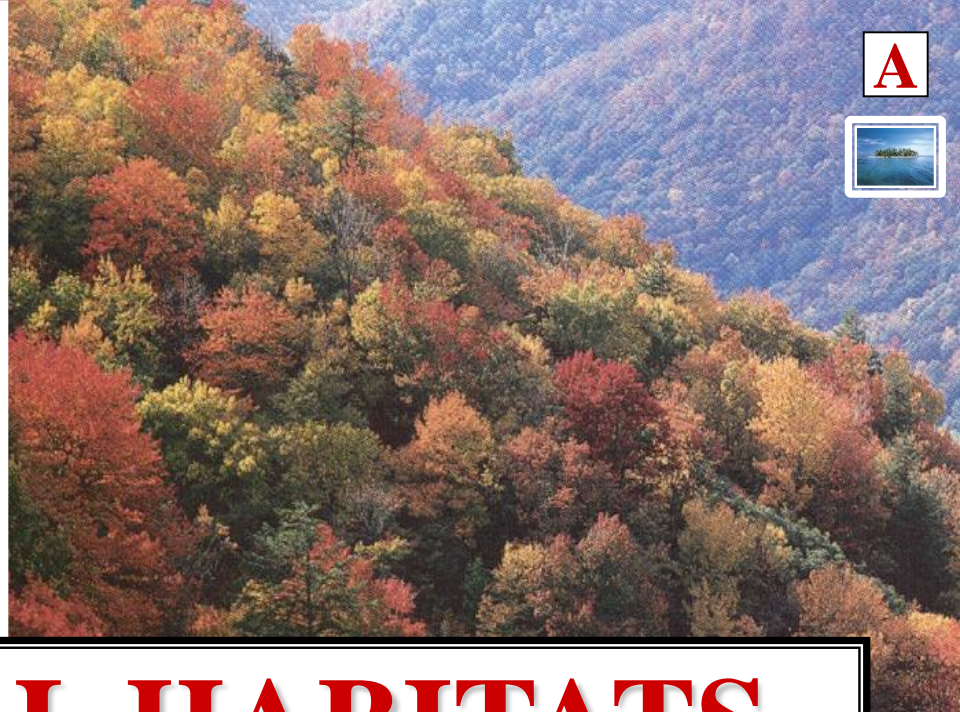


NEARLY UBIQUITOUS

EARTH

T





TERRESTRAL HABITATS





MARINE HABITATS



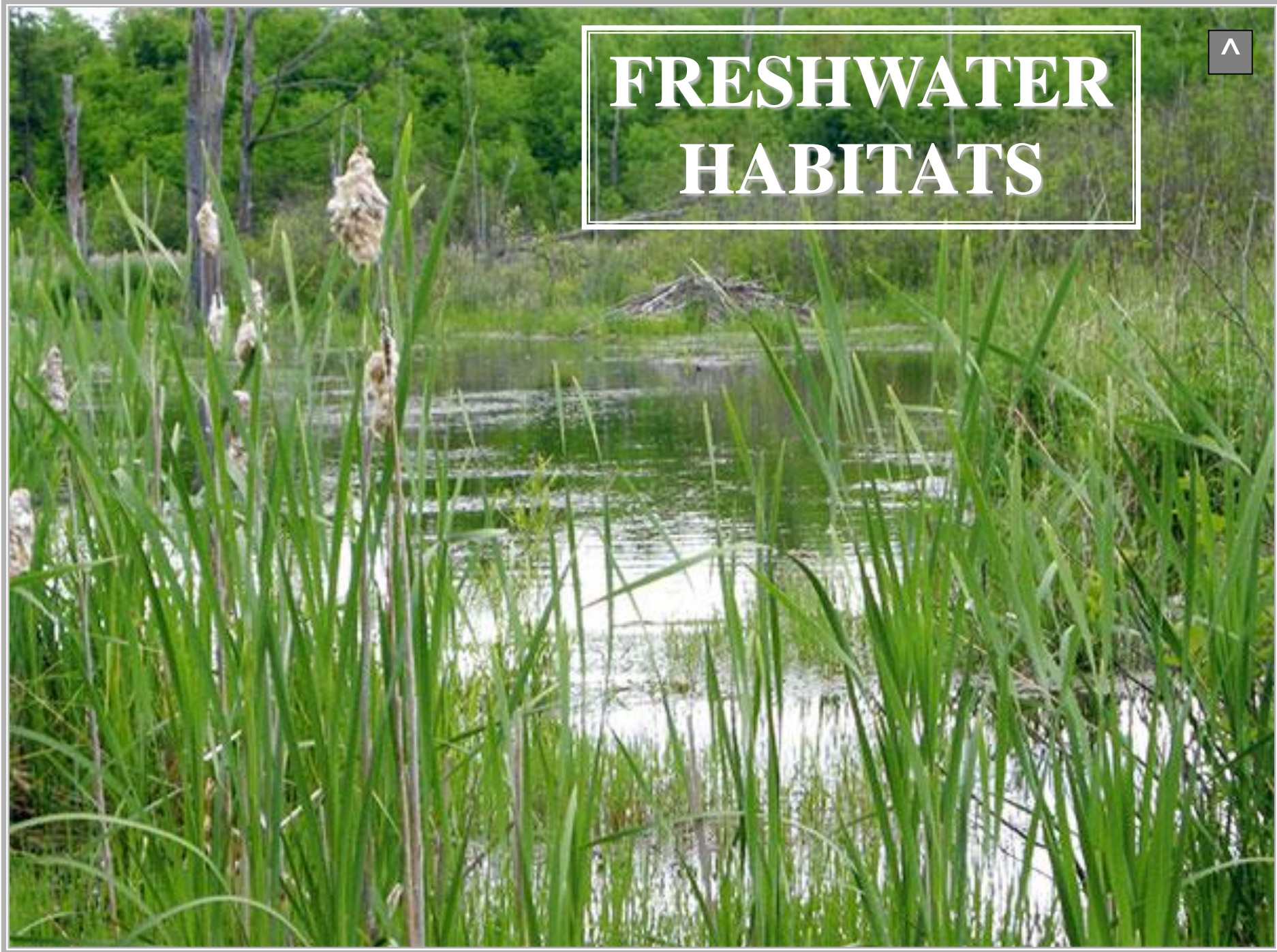
AQUATIC HABITATS



FRESHWATER HABITATS



FRESHWATER HABITATS





FOSSIL RECORD



2.7

BILLION YEARS

PRECAMBRIAN

The image is a composite. The background shows a volcanic eruption with a large plume of white smoke rising into a clear blue sky with scattered white clouds. In the foreground, there is a field of dark, rounded, porous-looking rocks, possibly volcanic scoria, scattered across a light-colored, sandy or silty ground. The overall scene is brightly lit, suggesting a clear day.



CYANOPHYTA EVOLVE





GENERAL CHARACTERS

GROWTH FORMS

CYANOBACTERIA GROWTH FORMS

UNICELLULAR

CYANOBACTERIA GROWTH FORMS

CYANOBACTERIA GROWTH FORMS

**UNICELLULAR
COLONIAL**

**CYANOBACTERIA
GROWTH FORMS**

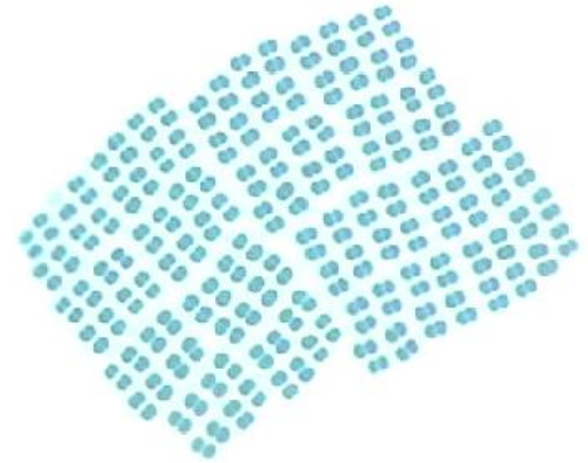


CYANOBACTERIA GROWTH FORMS

**UNICELLULAR
COLONIAL
FILAMENTOUS**

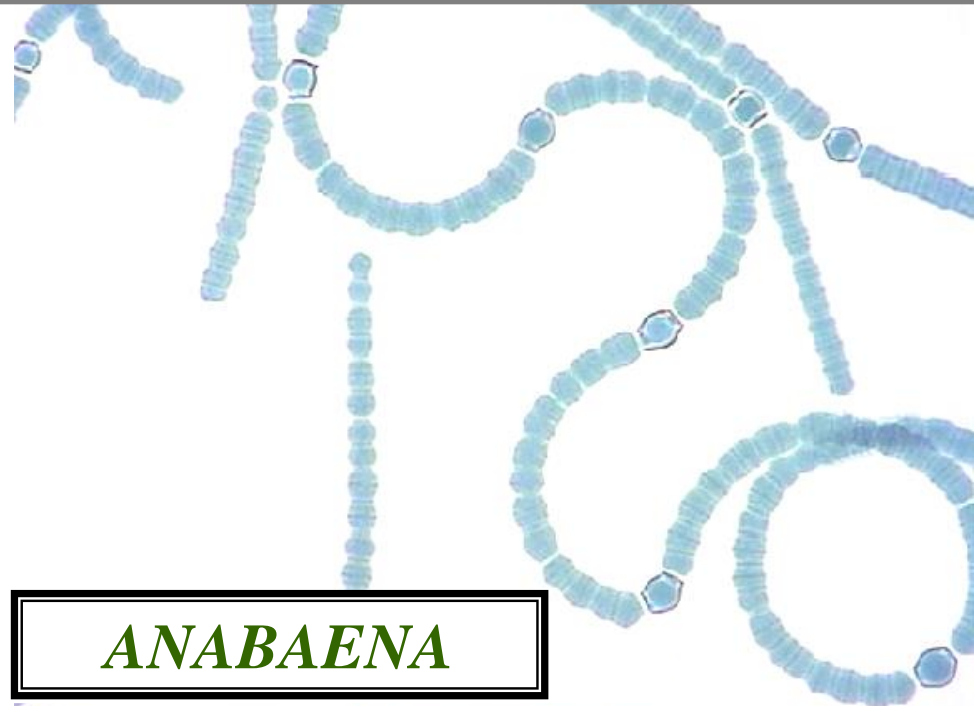
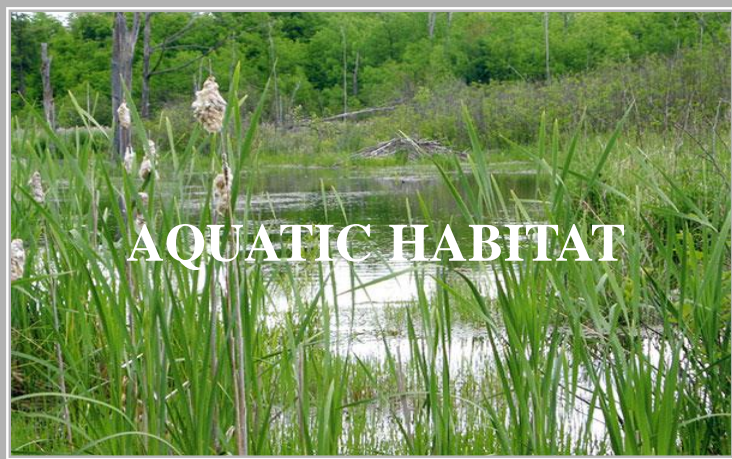
CYANOBACTERIA GROWTH FORMS

COLONY



MERISMOPEDIA

FILAMENTOUS



ANABAENA

FILAMENTOUS GROWTH FORM

FILAMENT



FILAMENT

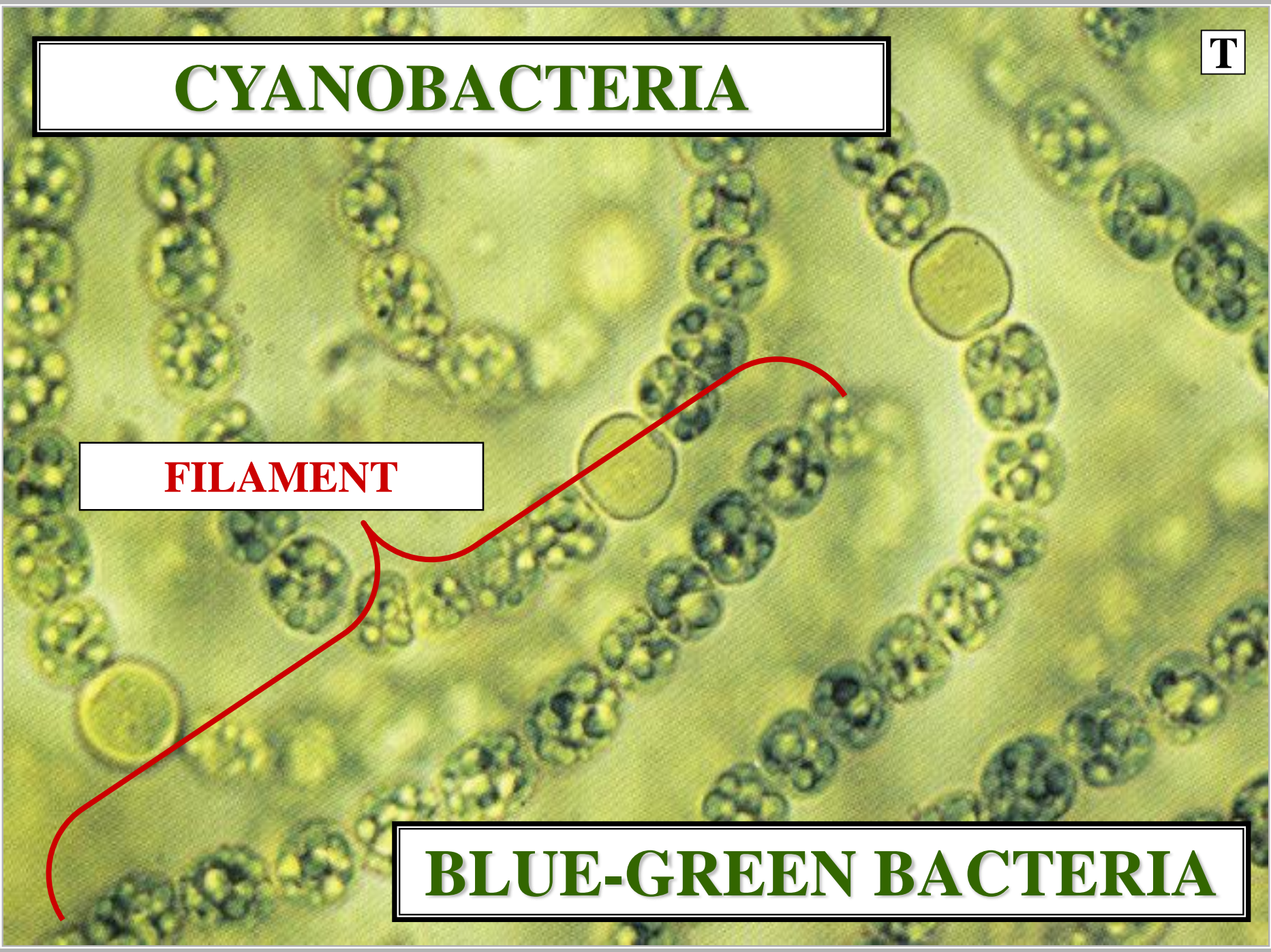
LINEAR CELL SERIES

FILAMENT

CYANOBACTERIA

FILAMENT

BLUE-GREEN BACTERIA



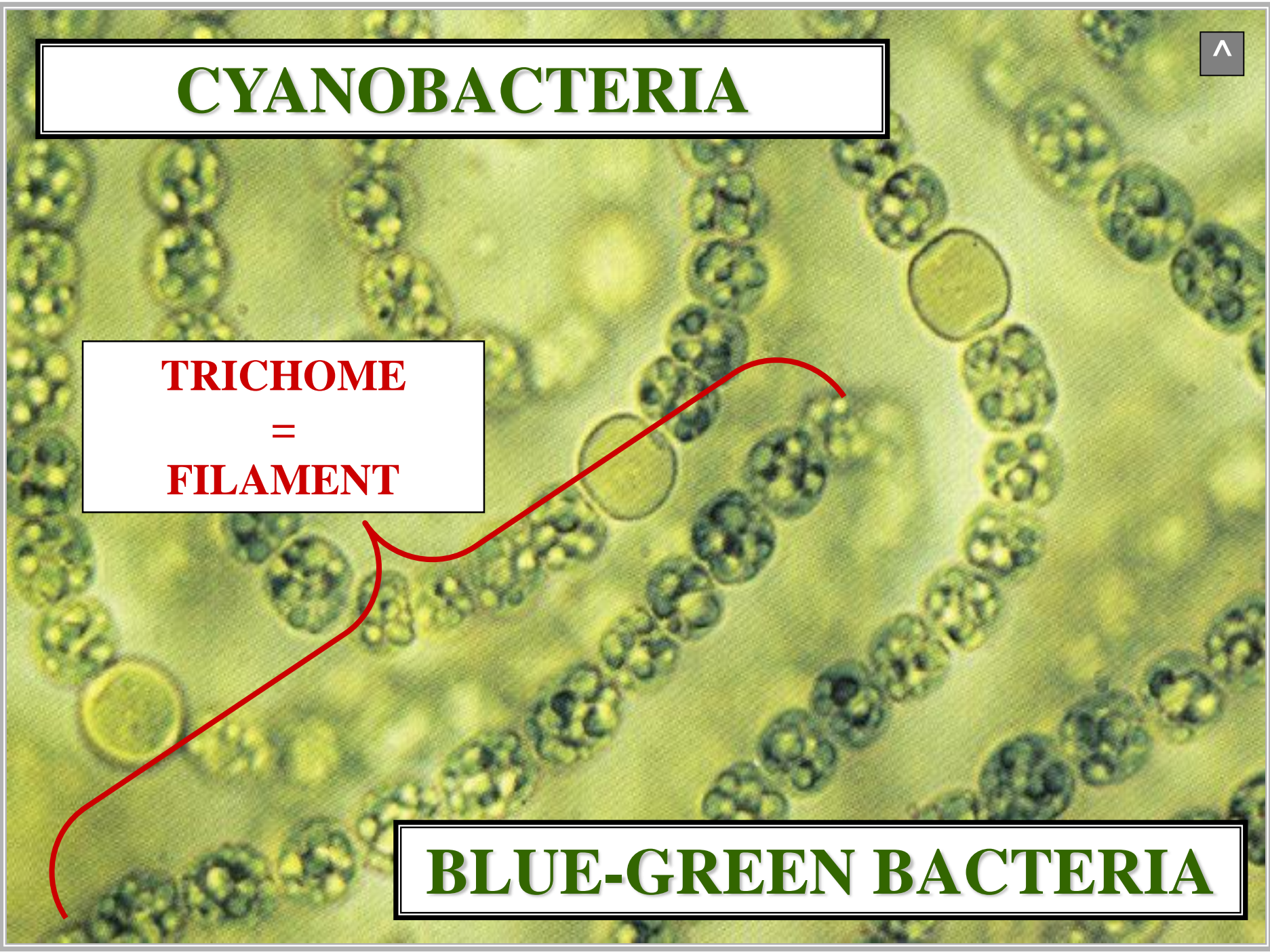


TRICHOME

CYANOBACTERIA

TRICHOME
=
FILAMENT

BLUE-GREEN BACTERIA



**TRICHOME
VEGETATIVE
CELLS
VS
MODIFIED
CELLS**

TRICHOME
VEGETATIVE
CELLS

TRICHOME VEGETATIVE CELLS



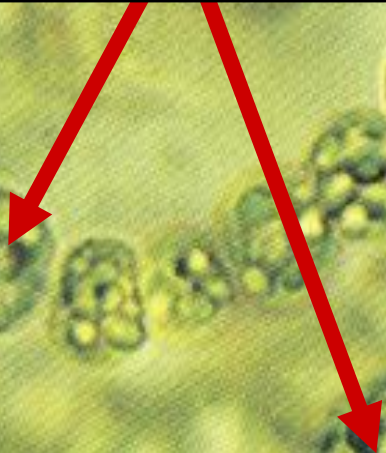
**PHOTOSYNTHESIS
ROLE**

**TRICHOME
VEGETATIVE CELLS**

CYANOBACTERIA



**VEGETATIVE
CELLS
PHOTOSYNTHESIS**



BLUE-GREEN BACTERIA

TRICHOME
MODIFIED
CELLS

TRICHOME MODIFIED CELLS



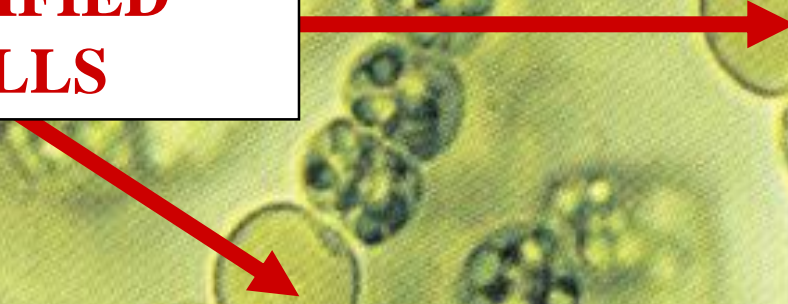
MODIFIED ROLE

TRICHOME MODIFIED CELLS

CYANOBACTERIA



**MODIFIED
CELLS**



BLUE-GREEN BACTERIA

TRICHOME MODIFIED CELL TYPES

HETERO CYST



**TRICHOME
MODIFIED CELLS
HETEROCYST**

CLEAR LIVING CELL

**TRICHOME
MODIFIED CELLS
HETEROCYST**



**TRICHOME
MODIFIED CELLS
HETEROCYST**

CLEAR LIVING CELL

POLAR NODULES

**TRICHOME
MODIFIED CELLS
HETEROCYST**

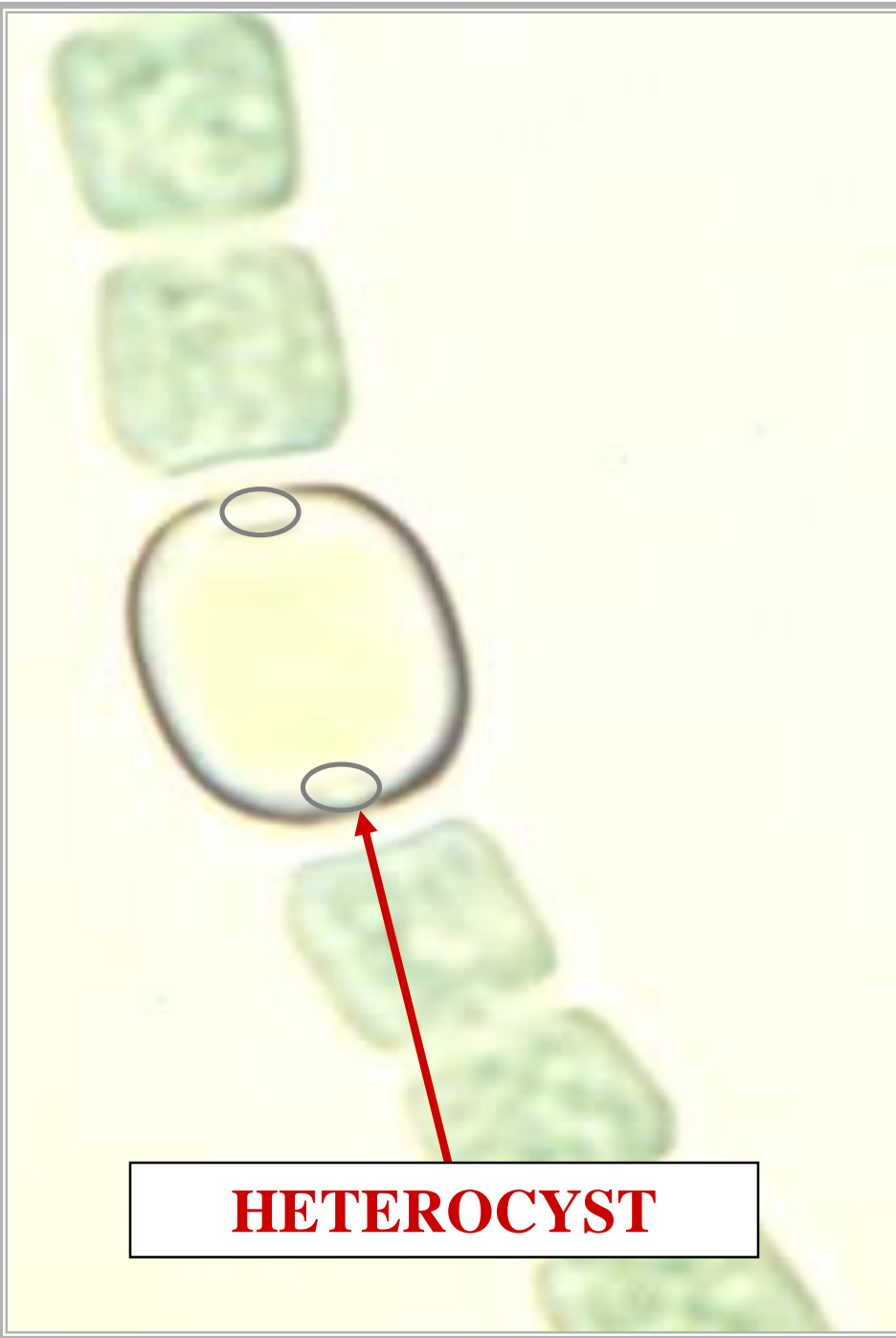


TRICHOME
MODIFIED CELLS
HETEROCYST
CLEAR LIVING CELL

POLAR NODULES

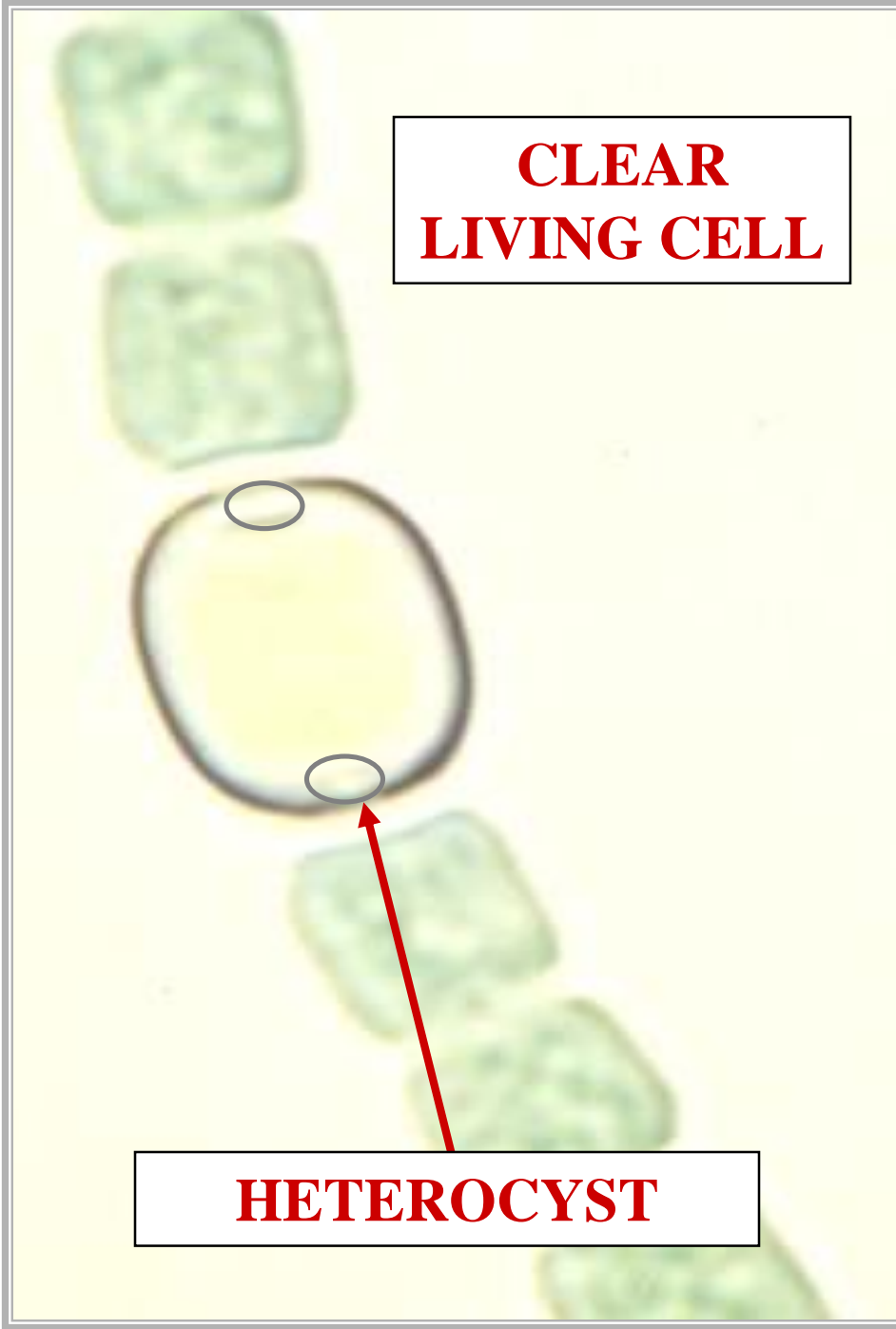
MODIFIED: N₂ FIXATION

TRICHOME
MODIFIED CELLS
HETEROCYST



**CLEAR
LIVING CELL**

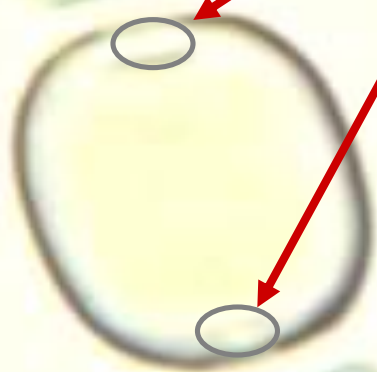
HETEROCYST



P



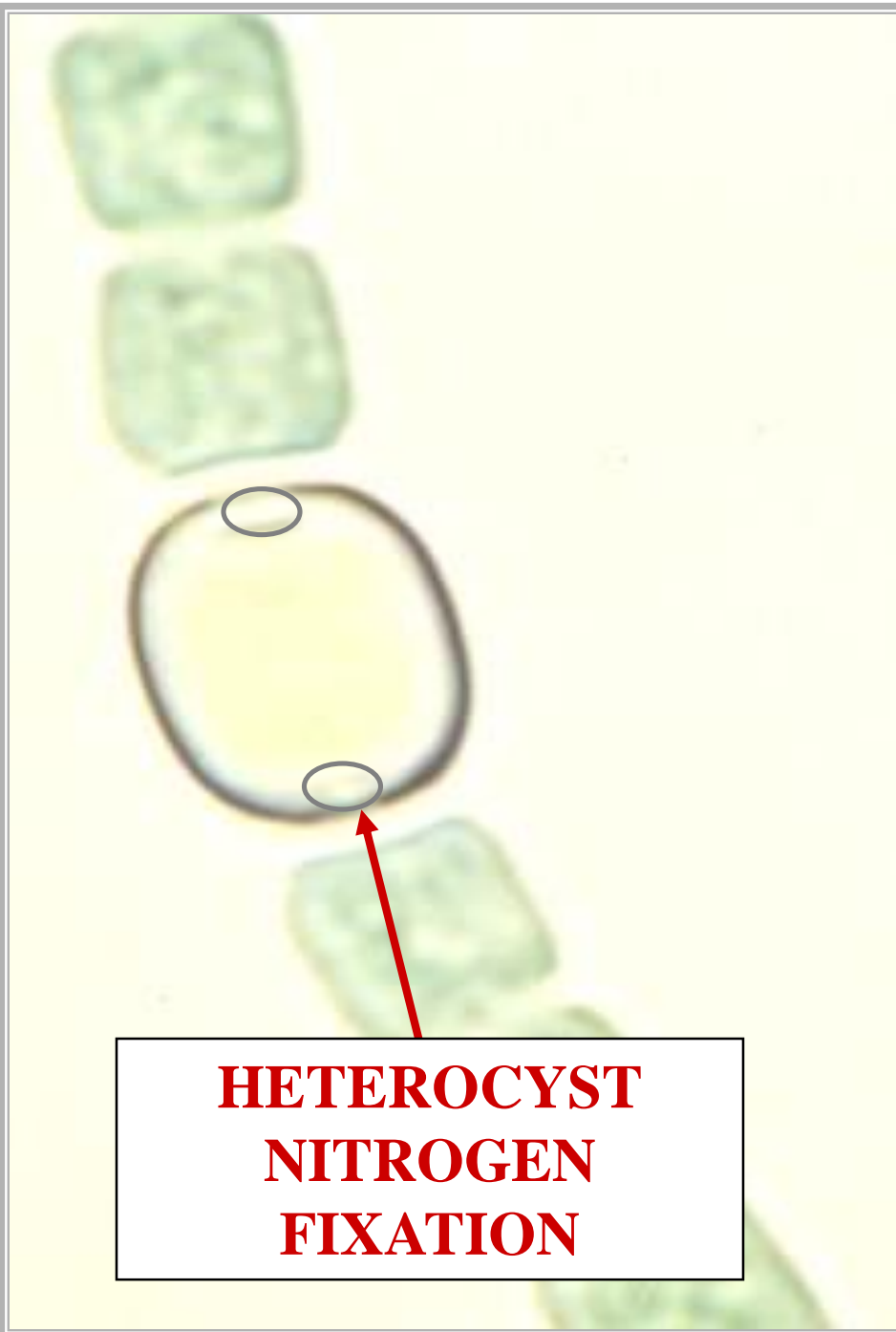
**POLAR
NODULES**



HETEROCYST

N





**HETEROCYST
NITROGEN
FIXATION**



^
A

AKINETE



**TRICHOME
MODIFIED CELLS
AKINETE**

**DARK LIVING
THICK-WALLED CELL**

**TRICHOME
MODIFIED CELLS
AKINETE**



**TRICHOME
MODIFIED CELLS
AKINETE**

**DARK LIVING
THICK-WALLED CELL**

SURVIVES DRY CONDITIONS

**TRICHOME
MODIFIED CELLS
AKINETE**



**TRICHOME
MODIFIED CELLS
AKINETE**

**DARK LIVING
THICK-WALLED CELL**

SURVIVES DRY CONDITIONS

MODIFIED: PROPAGATION

**TRICHOME
MODIFIED CELLS
AKINETE**



D

AKINETE



S



**DARK LIVING
THICK-WALLED
CELL**

AKINETE

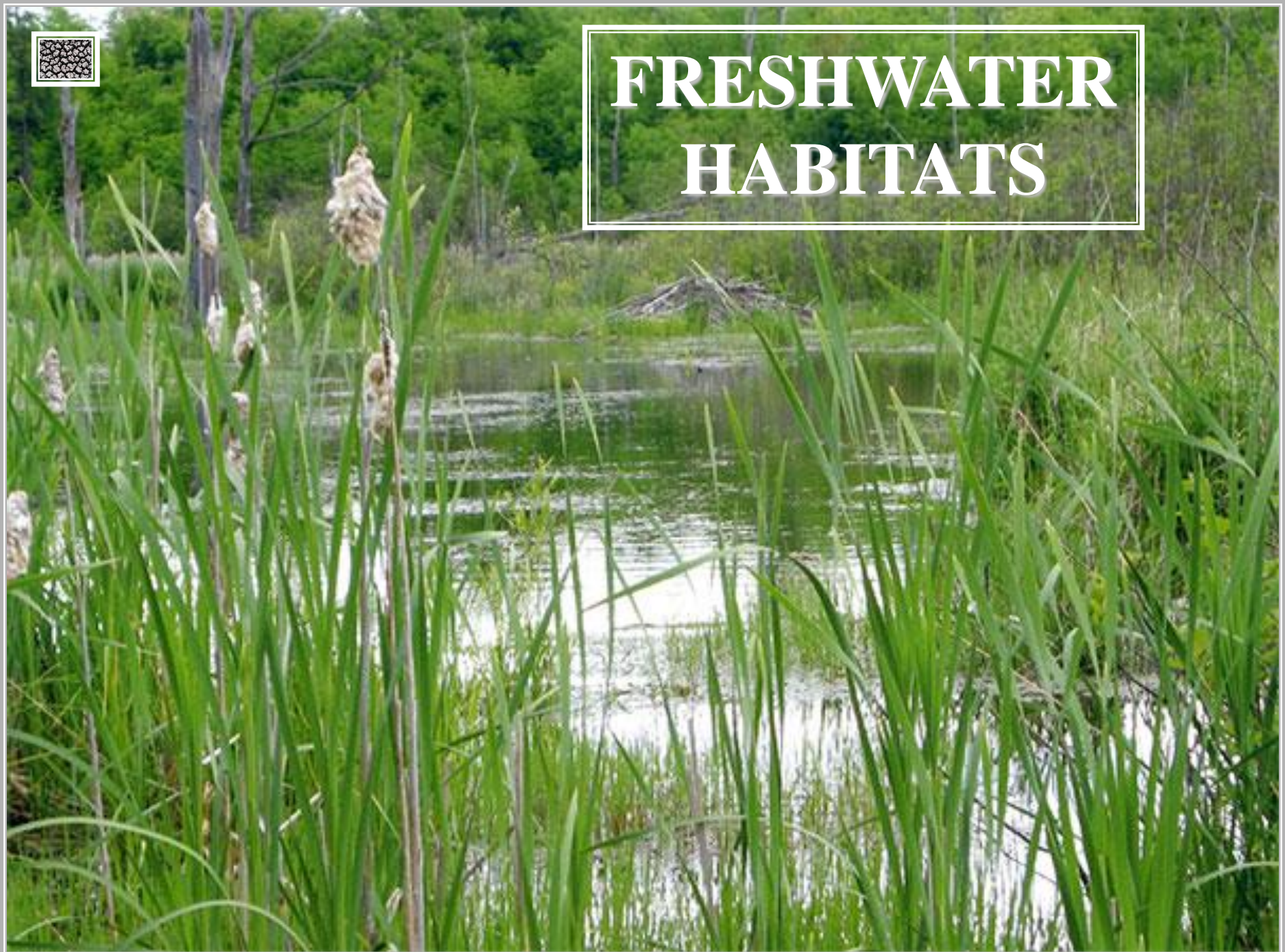


**SURVIVES
DRY DROUGHT
CONDITIONS**

AKINETE



FRESHWATER HABITATS





A

FRESHWATER HABITATS

A large, central image showing a close-up of dark, cracked, and parched soil, illustrating drought conditions. The cracks are deep and irregular, forming a grid-like pattern across the surface.

DRY
DROUGHT
CONDITIONS





P

FRESHWATER HABITATS

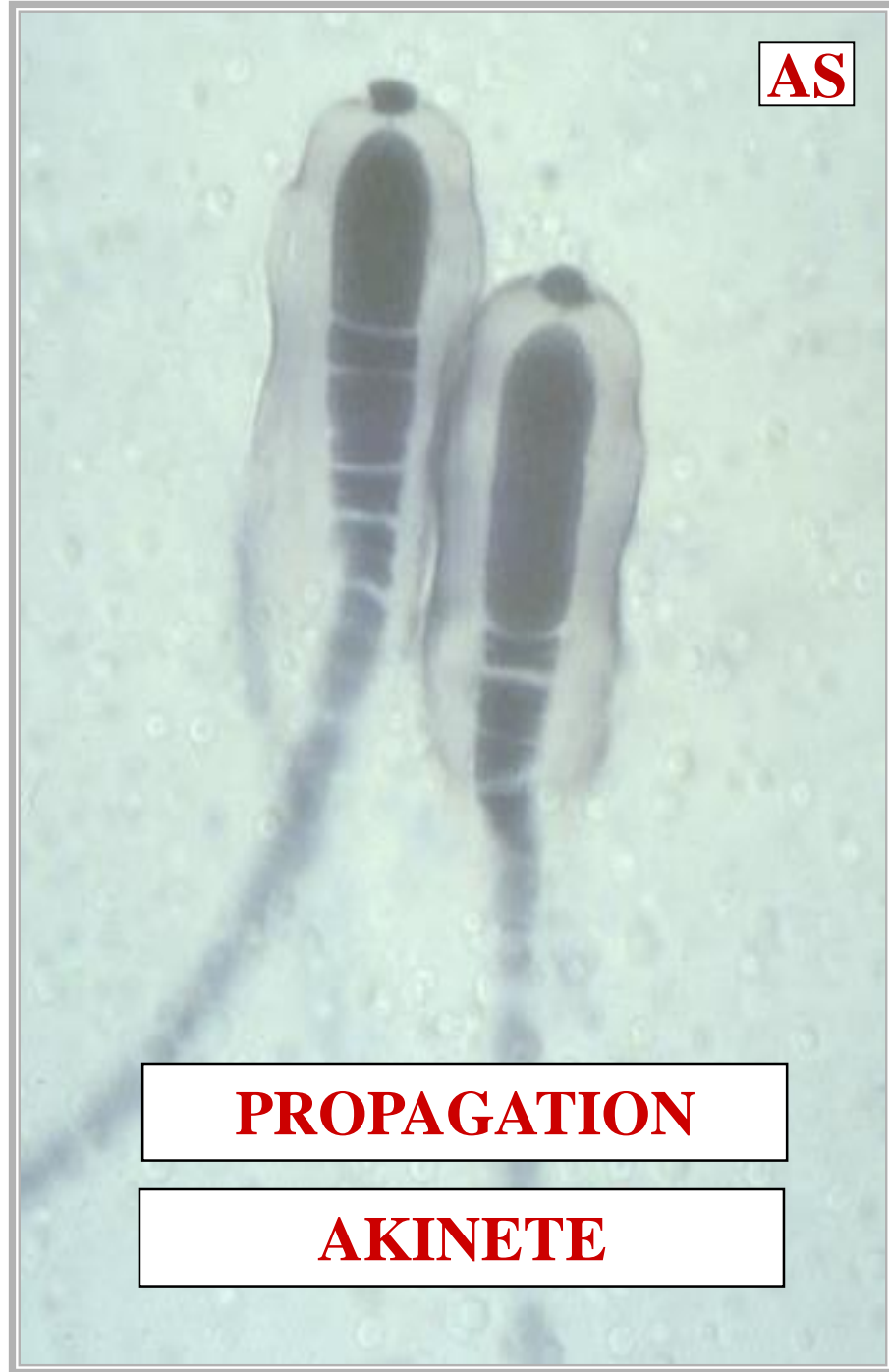


AKINETE
SURVIVES
DROUGHT

The central image shows a large, rectangular area of cracked, dry earth, illustrating the concept of drought. The cracks are deep and form a grid-like pattern across the surface. This image is framed by a white border.



AS

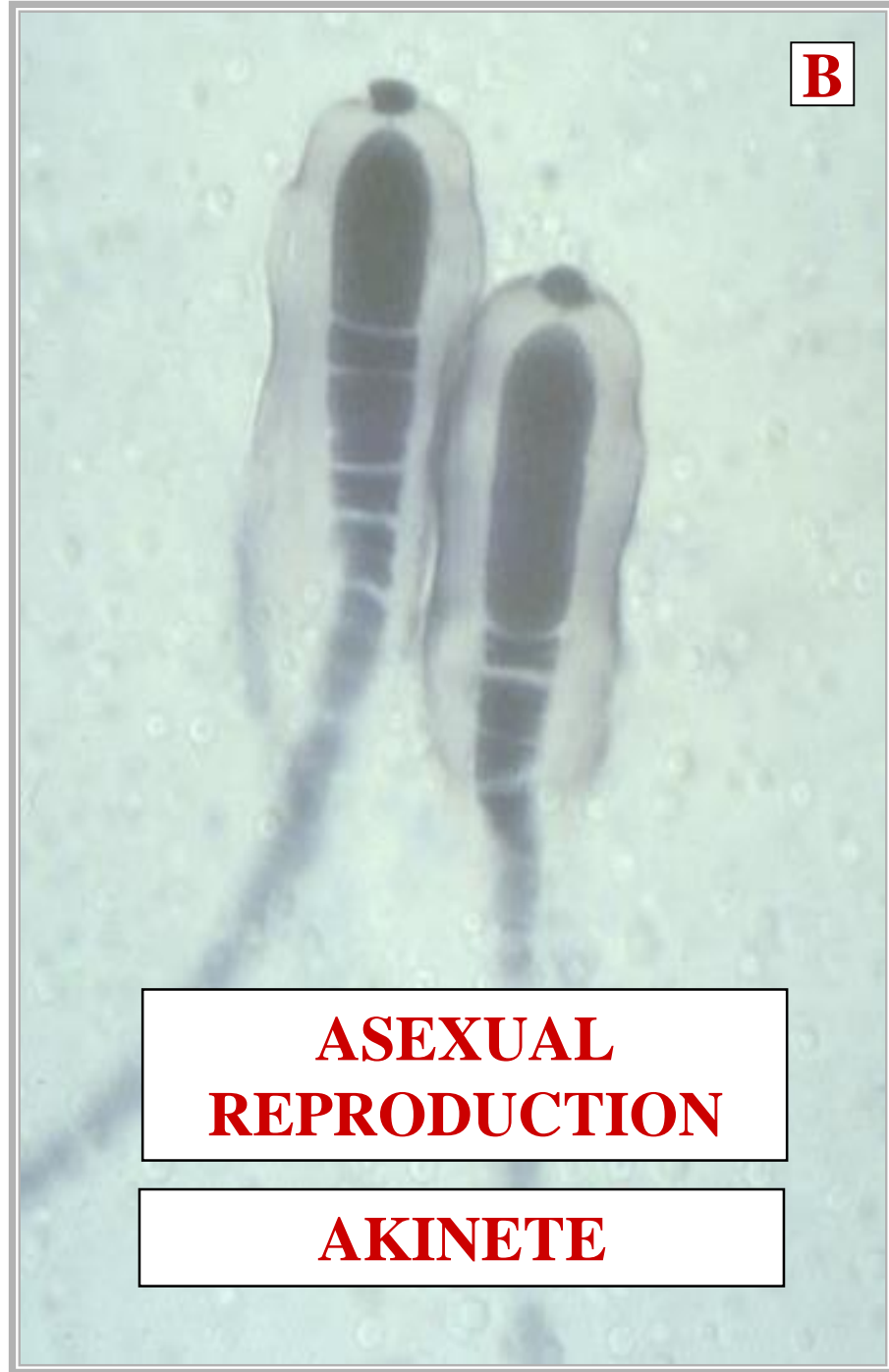


PROPAGATION

AKINETE

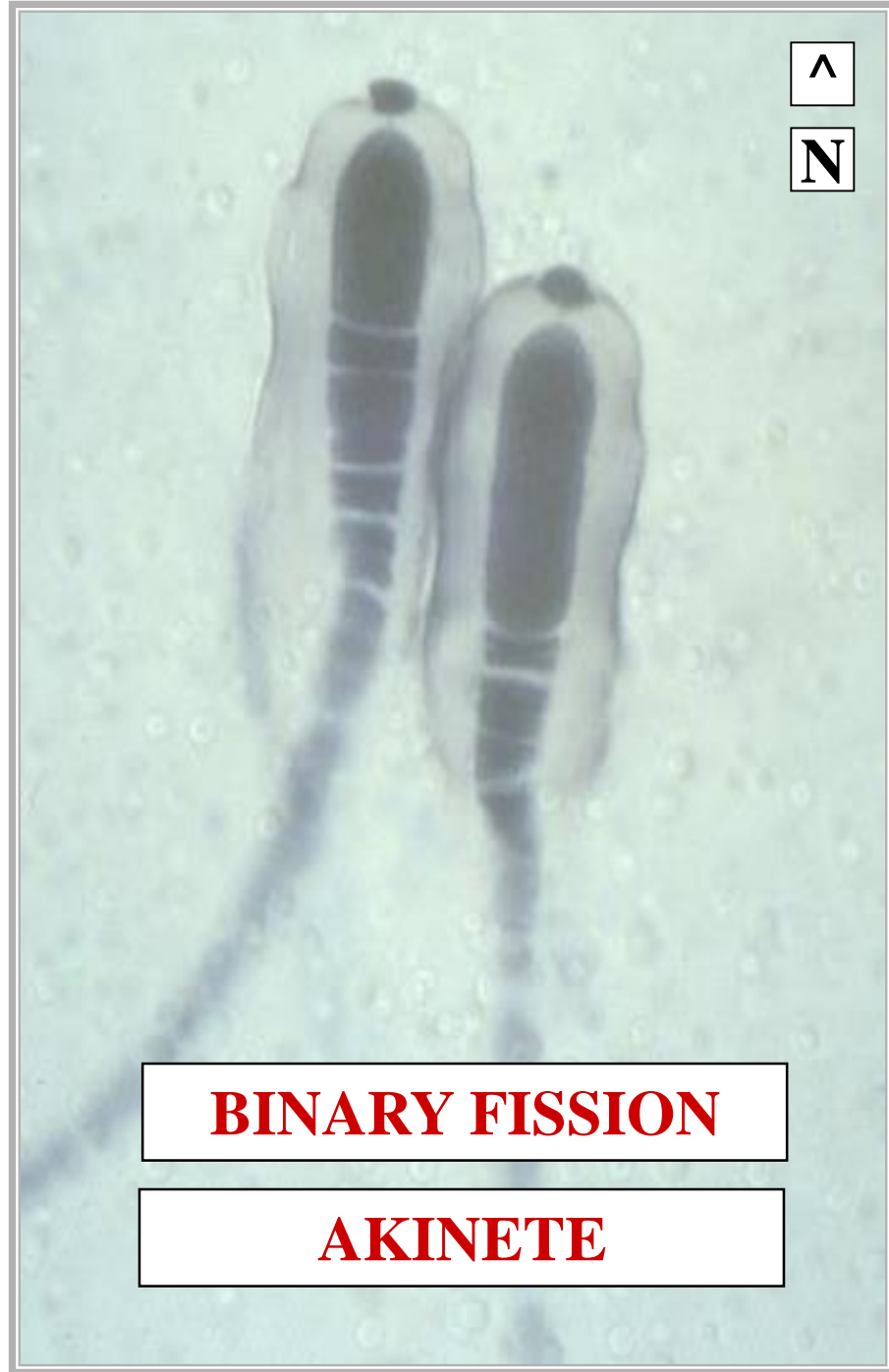


B



**ASEXUAL
REPRODUCTION**

AKINETE



^

N

BINARY FISSION

AKINETE

NECRIDIUM



**TRICHOME
MODIFIED CELLS
NECRIDIUM**

CLEAR DEAD CELL →

**TRICHOME
MODIFIED CELLS
NECRIDIUM**



**TRICHOME
MODIFIED CELLS
NECRIDIUM**

CLEAR DEAD CELL →

TRICHOME FRAGMENTS

**TRICHOME
MODIFIED CELLS
NECRIDIUM**



**TRICHOME
MODIFIED CELLS
NECRIDIUM**

CLEAR DEAD CELL →

TRICHOME FRAGMENTS

HORMOGONIA

**TRICHOME
MODIFIED CELLS
NECRIDIUM**



**TRICHOME
MODIFIED CELLS
NECRIDIUM**

CLEAR DEAD CELL →

TRICHOME FRAGMENTS

HORMOGONIA

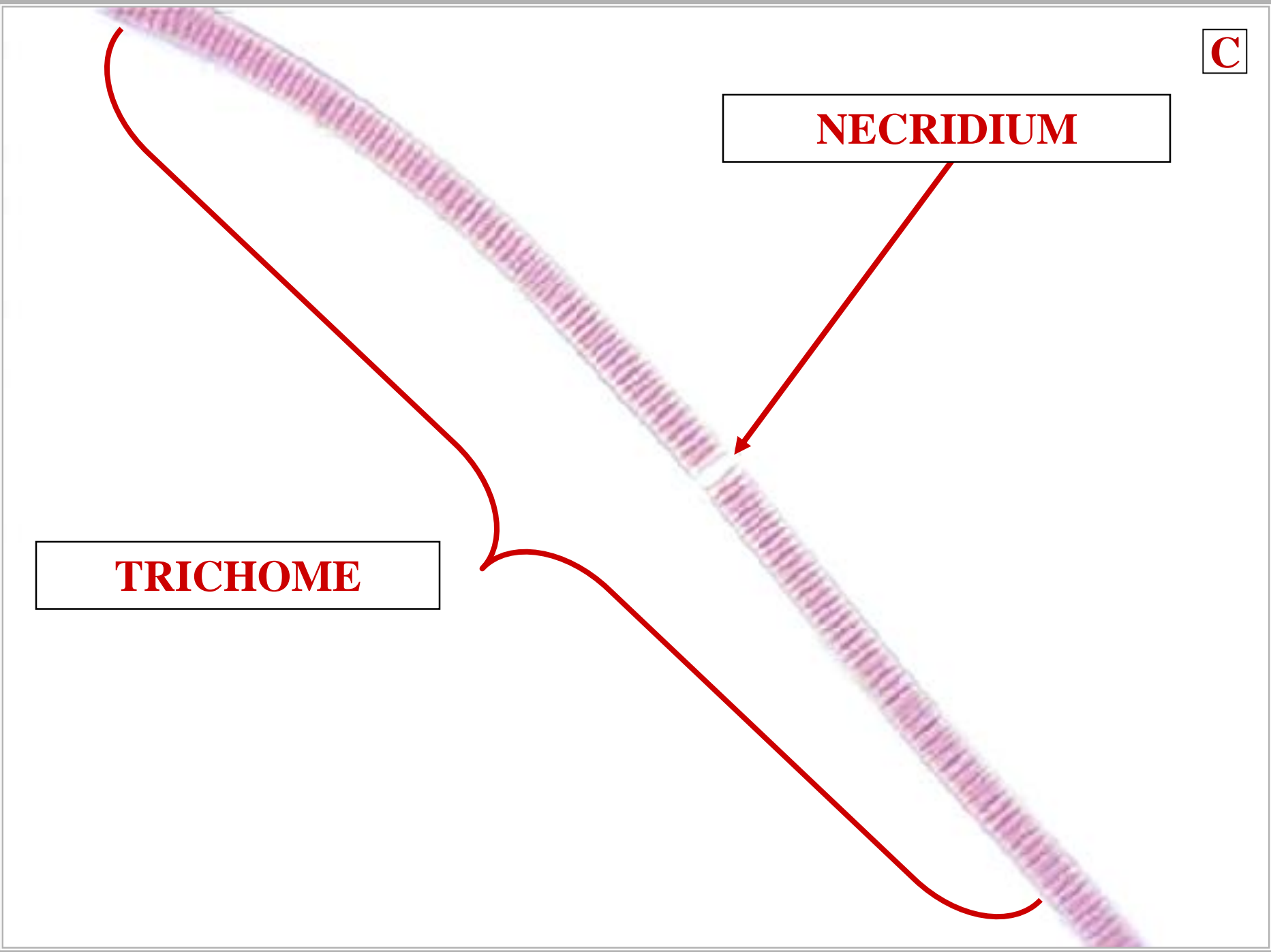
MODIFIED: PROPAGATION

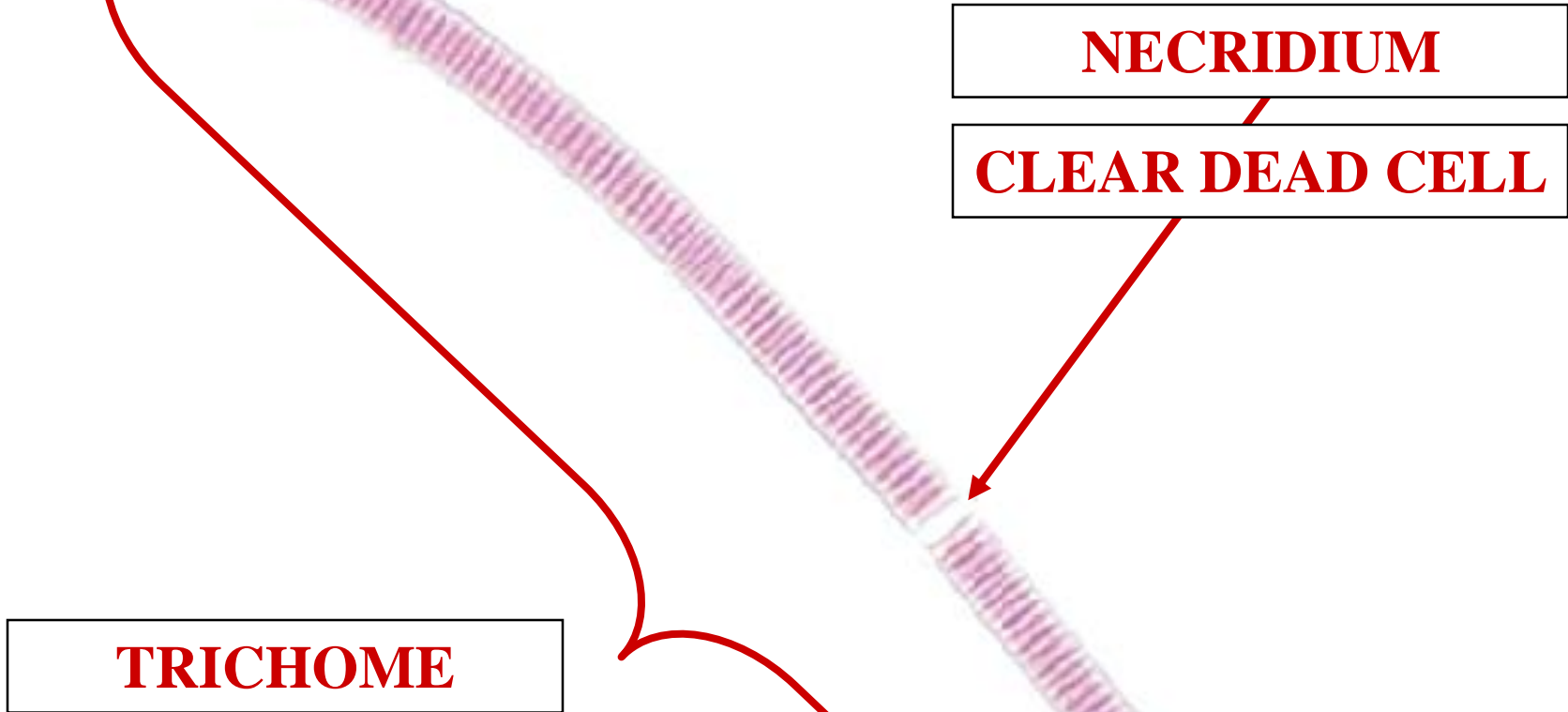
**TRICHOME
MODIFIED CELLS
NECRIDIUM**

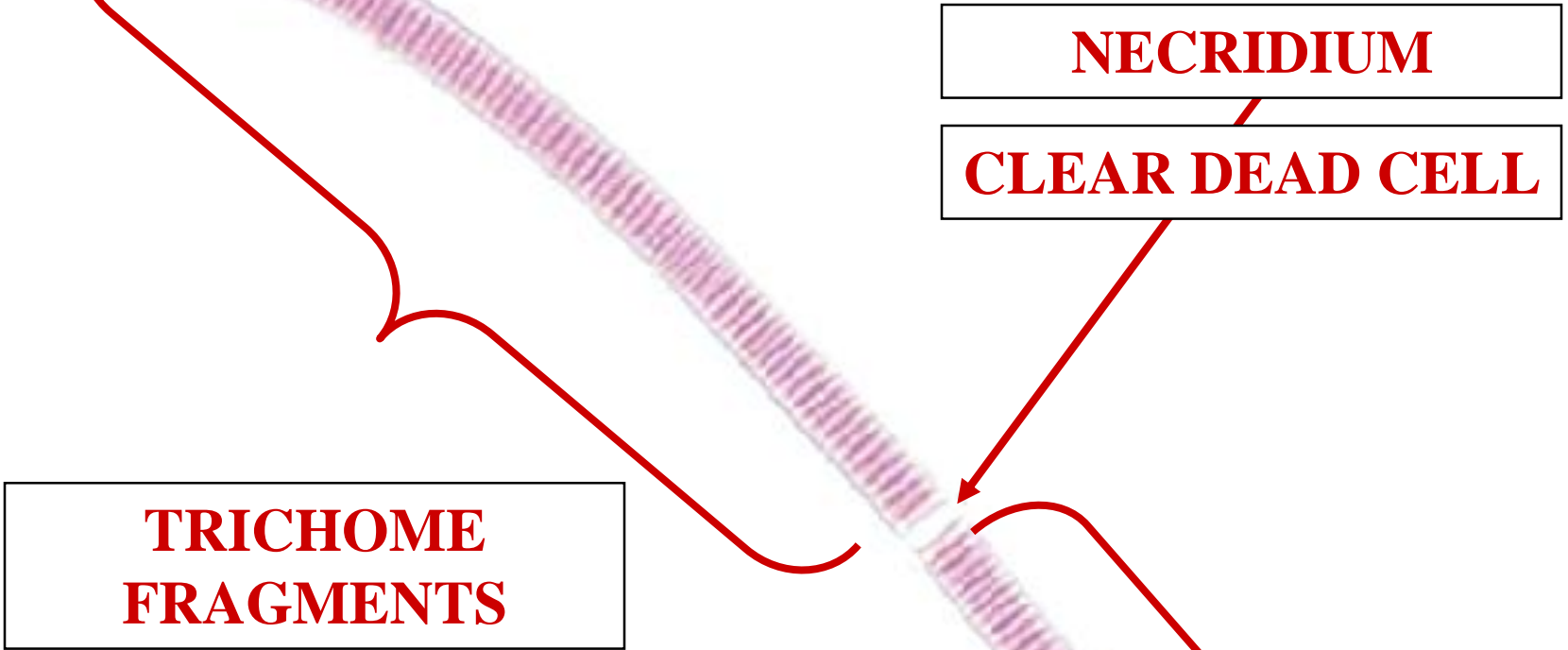
C

NECRIDIUM

TRICHOME







**TRICHOME
FRAGMENTS**

NECRIDIUM

CLEAR DEAD CELL



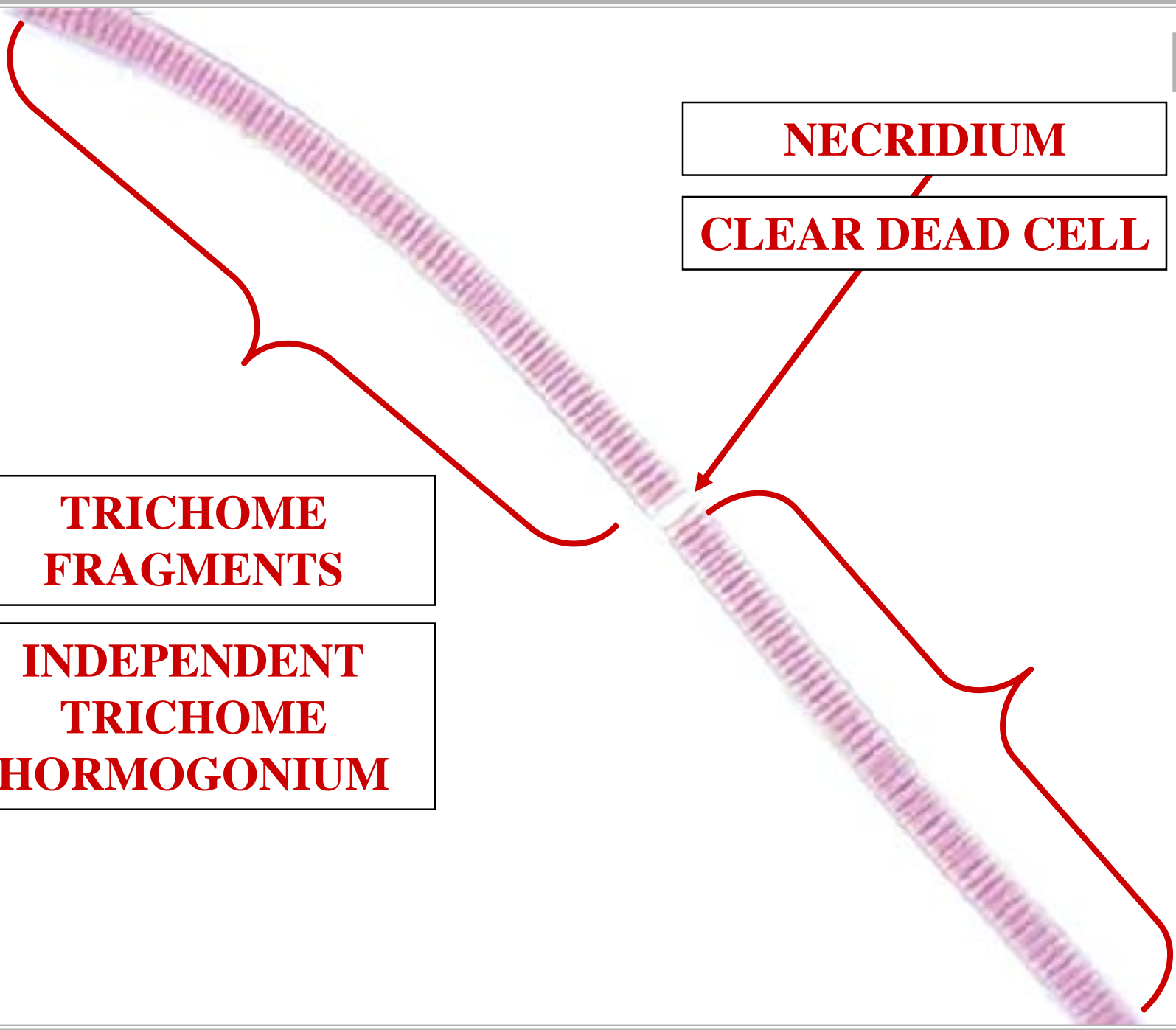
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NECRIDIUM

CLEAR DEAD CELL

**TRICHOME
FRAGMENTS**

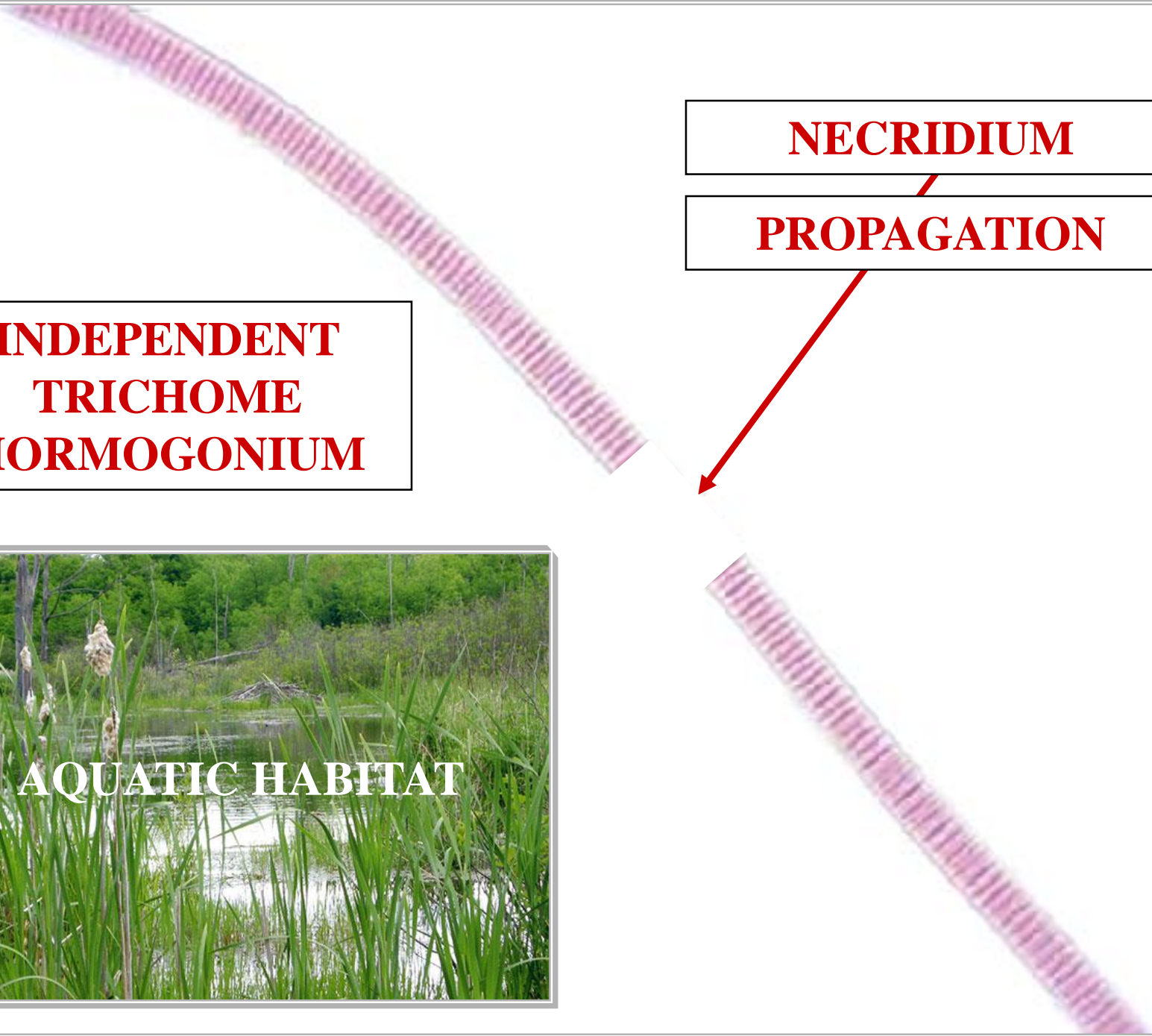
**INDEPENDENT
TRICHOME
HORMOGONIUM**



NECRIDIUM

PROPAGATION

**INDEPENDENT
TRICHOME
HORMOGONIUM**



**INDEPENDENT
TRICHOME
HORMOGONIUM**

NECRIDIUM

FRAGMENTATION



AQUATIC HABITAT



NECRIDIUM

**ASEXUAL
REPRODUCTION**



**INDEPENDENT
TRICHOME
HORMOGONIUM**



AQUATIC HABITAT



CYTOLOGY

CELL WALL

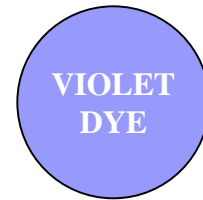
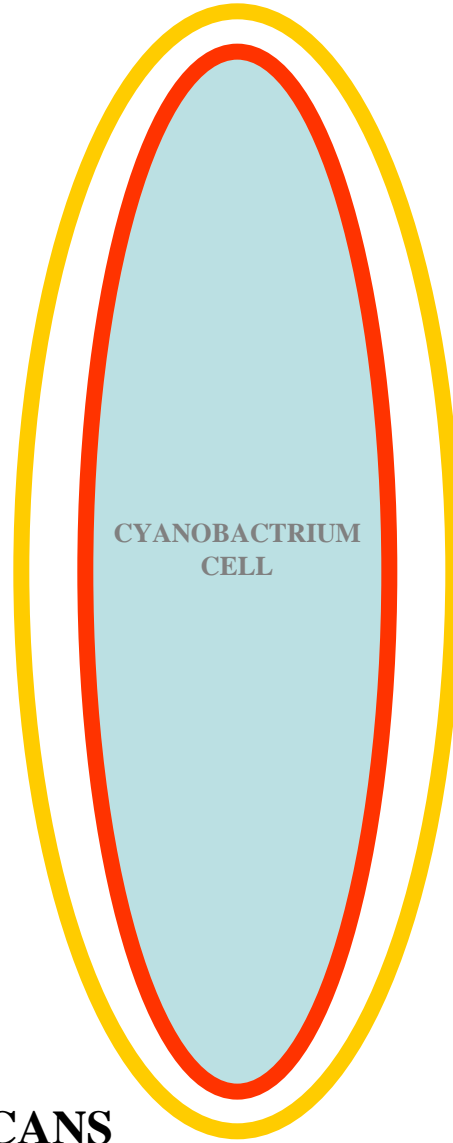


GRAM STAIN TEST

CYANOBACTERIA



GRAM STAIN TEST



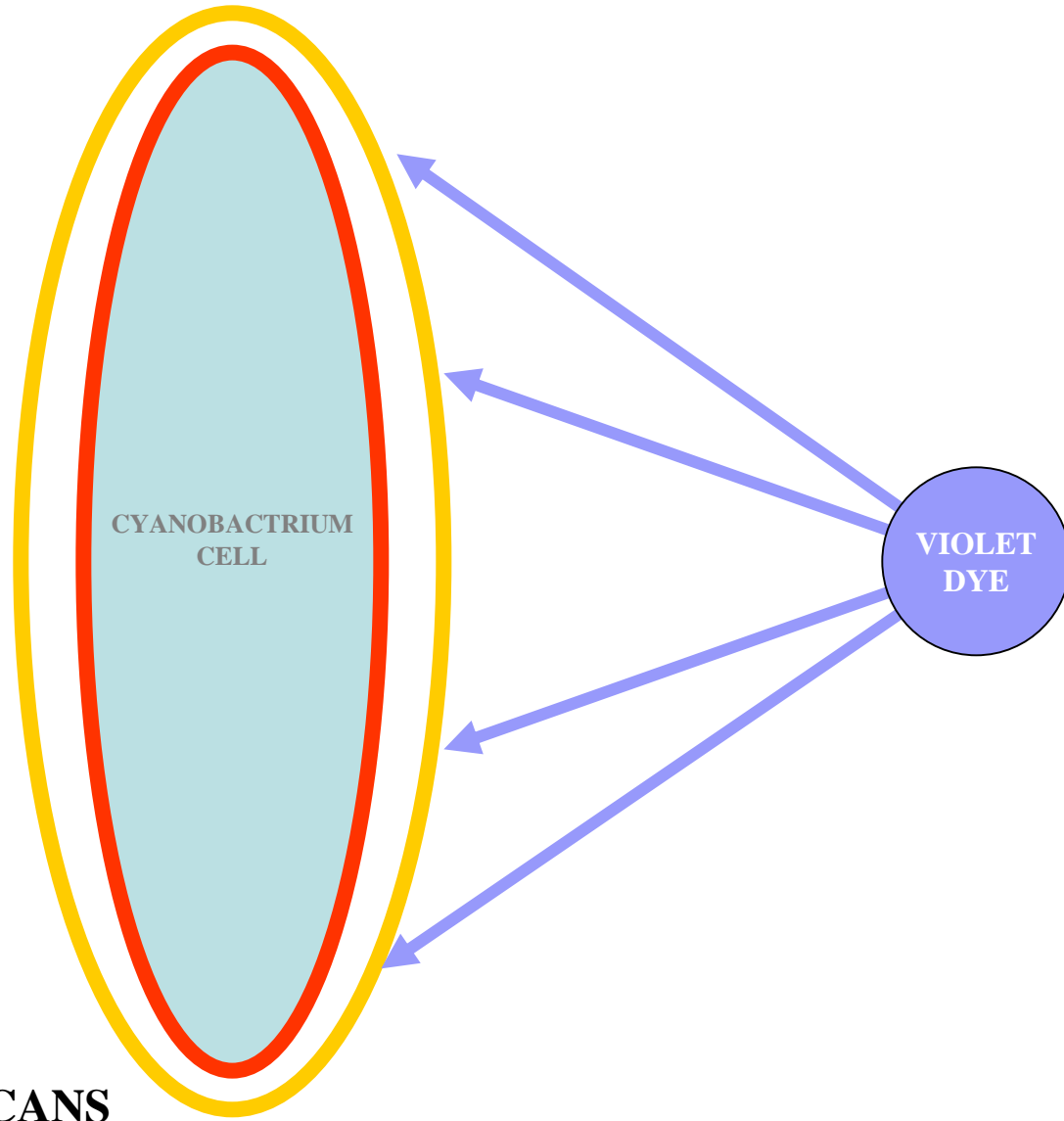
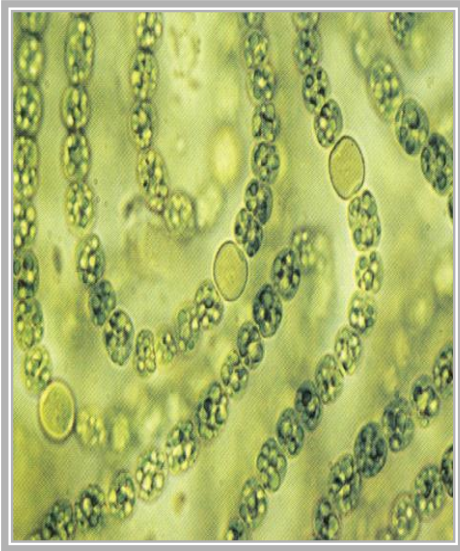
 = PEPTIDOGLYCANS

 = LIPOPOLYSACCHARIDES – **PRESENT**

CYANOBACTERIA



GRAM STAIN TEST

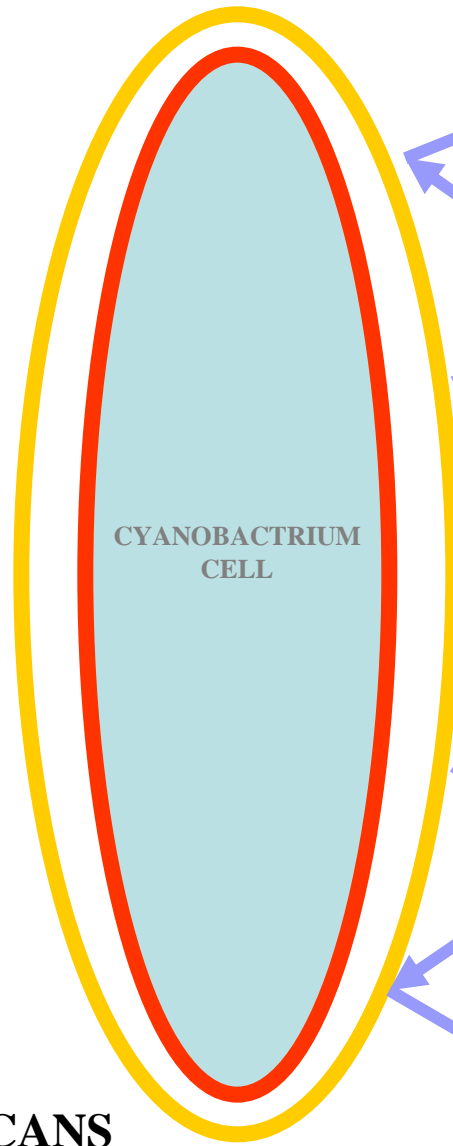


 = PEPTIDOGLYCANS

 = LIPOPOLYSACCHARIDES – **PRESENT**

CYANOBACTERIA

GRAM STAIN TEST





**REPELS
VIOLET DYE**

P

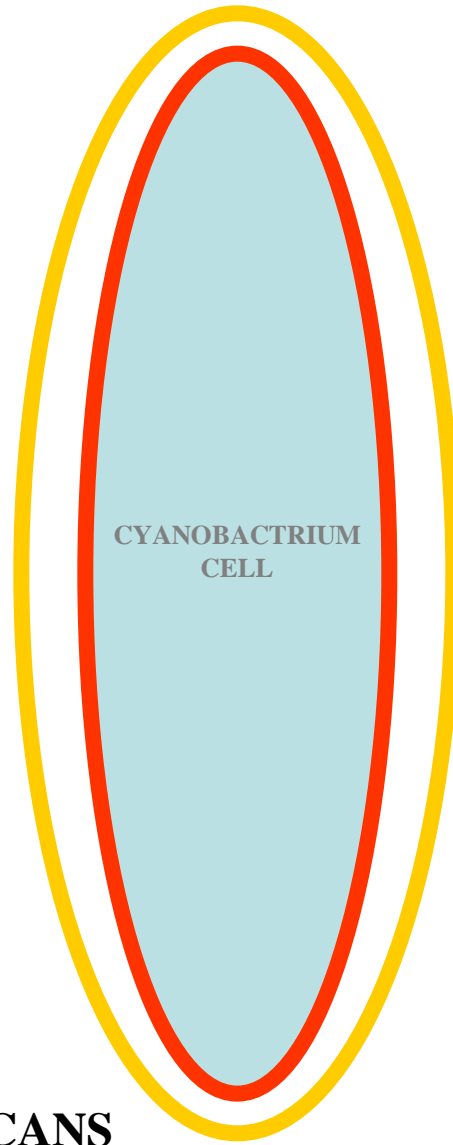
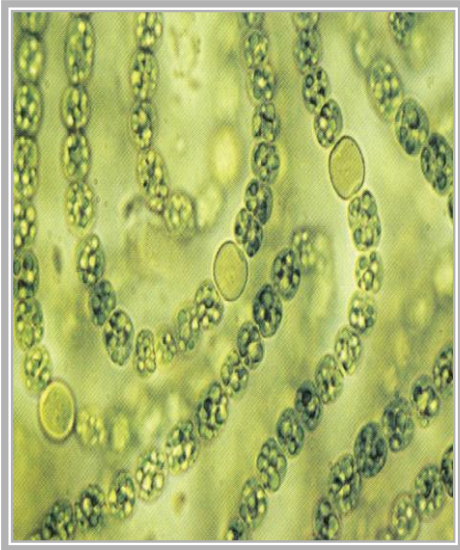
**VIOLET
DYE**

**REPELS
VIOLET DYE**

-  = PEPTIDOGLYCANS
-  = LIPOPOLYSACCHARIDES – **PRESENT**

CYANOBACTERIA

GRAM STAIN TEST



**PEPTIDOGLYCANS
DO NOT ABSORB
VIOLET DYE**

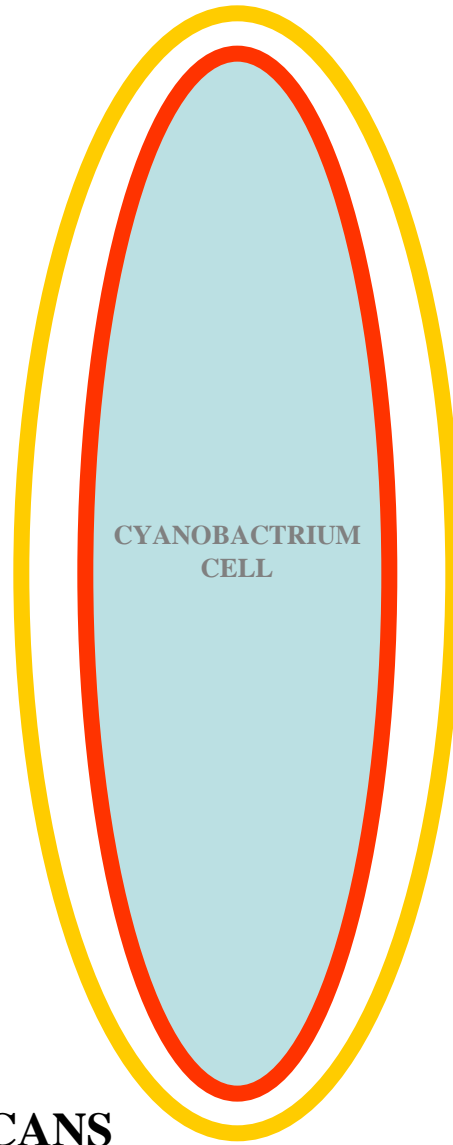
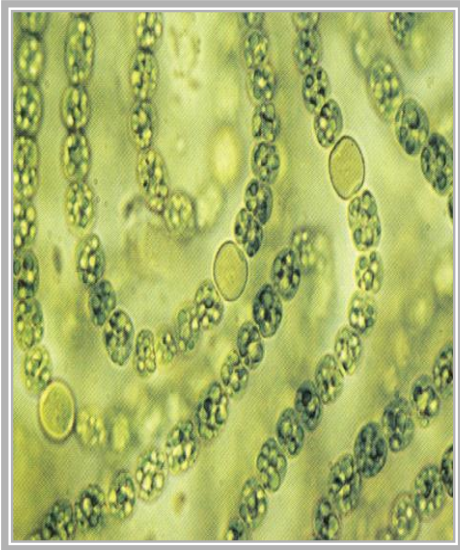
 = PEPTIDOGLYCANS

 = LIPOPOLYSACCHARIDES – **PRESENT**

CYANOBACTERIA



GRAM STAIN TEST



**PEPTIDOGLYCANS
DO NOT TURN
VIOLET**

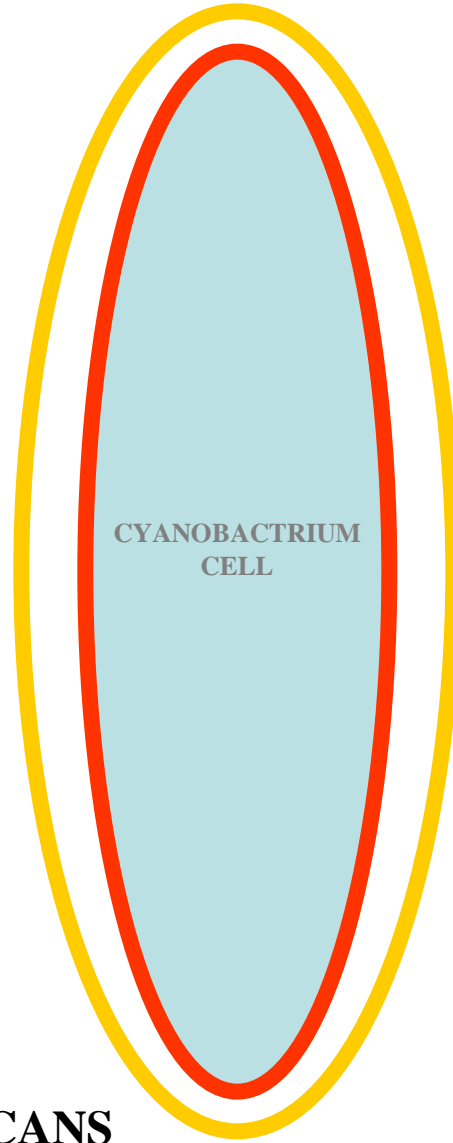
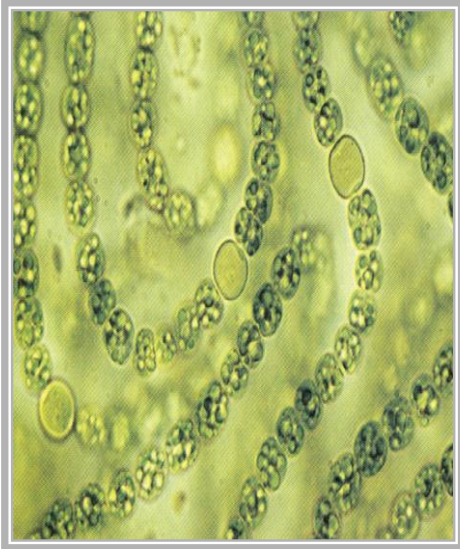
 = PEPTIDOGLYCANS

 = LIPOPOLYSACCHARIDES – **PRESENT**

CYANOBACTERIA



GRAM STAIN TEST



**CELL WALL
DOES NOT TURN
VIOLET**

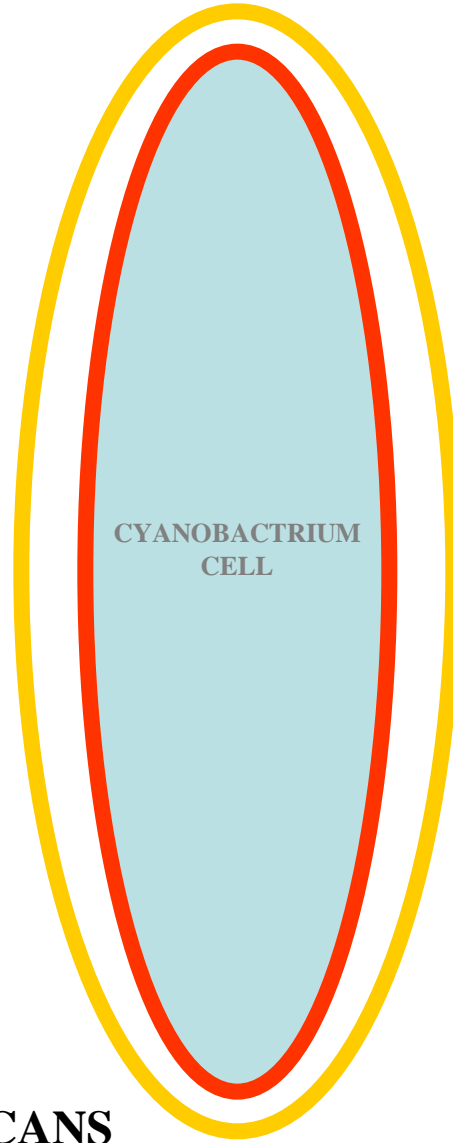
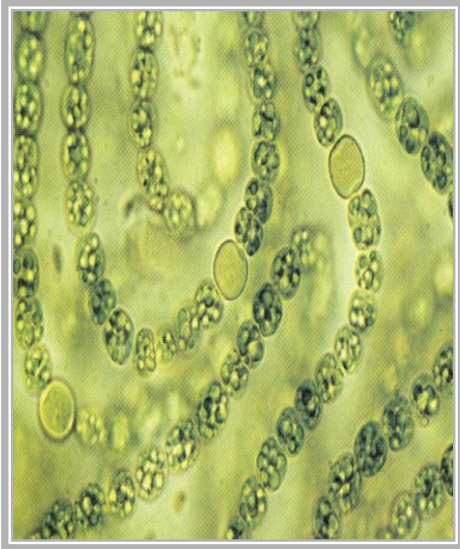
 = PEPTIDOGLYCANS

 = LIPOPOLYSACCHARIDES – **PRESENT**

CYANOBACTERIA



GRAM STAIN TEST



?

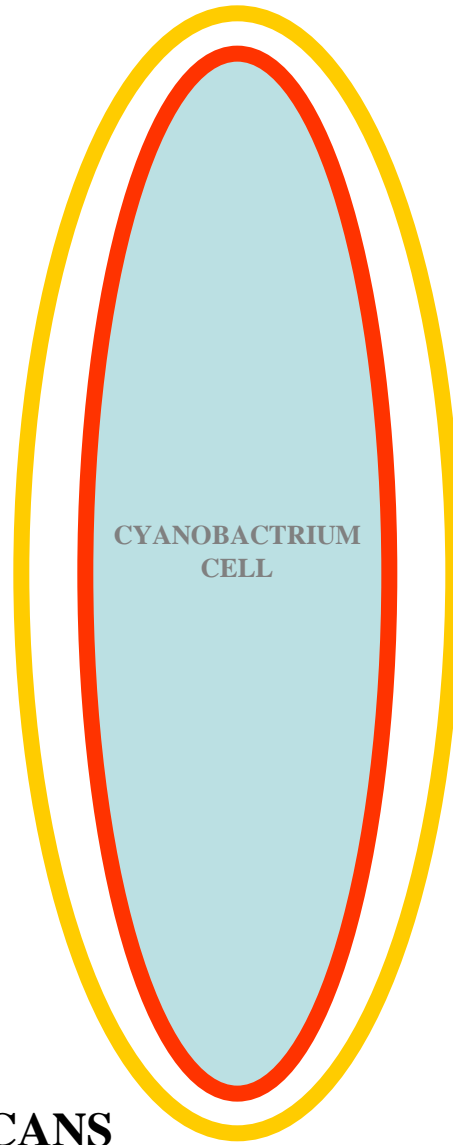
EUBACTERIUM

 = PEPTIDOGLYCANS

 = LIPOPOLYSACCHARIDES – **PRESENT**

CYANOBACTERIA

GRAM STAIN TEST

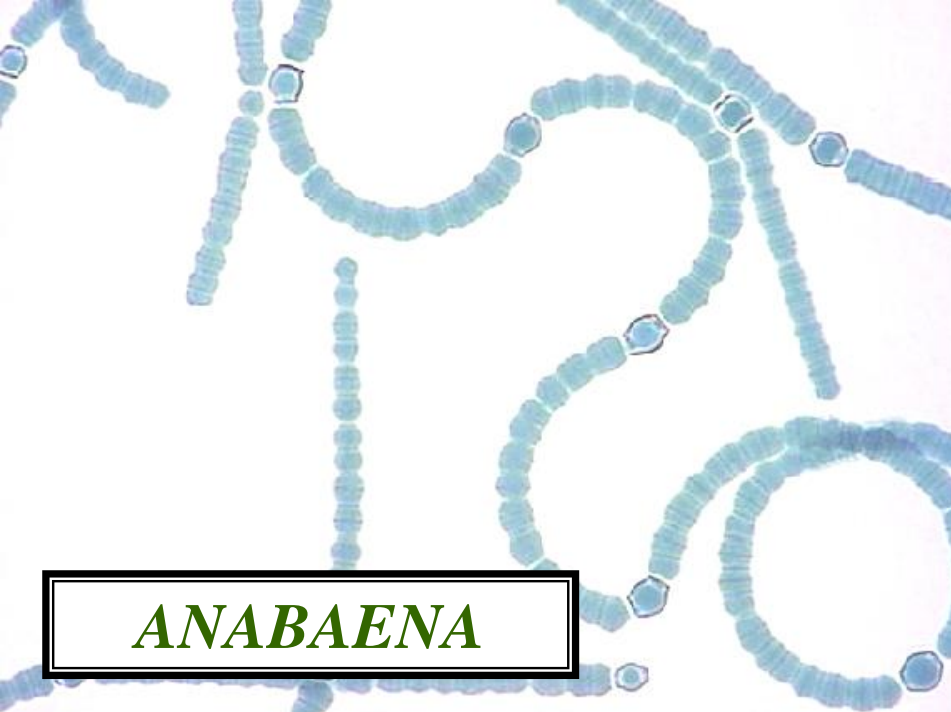


**GRAM -
EUBACTERIUM**

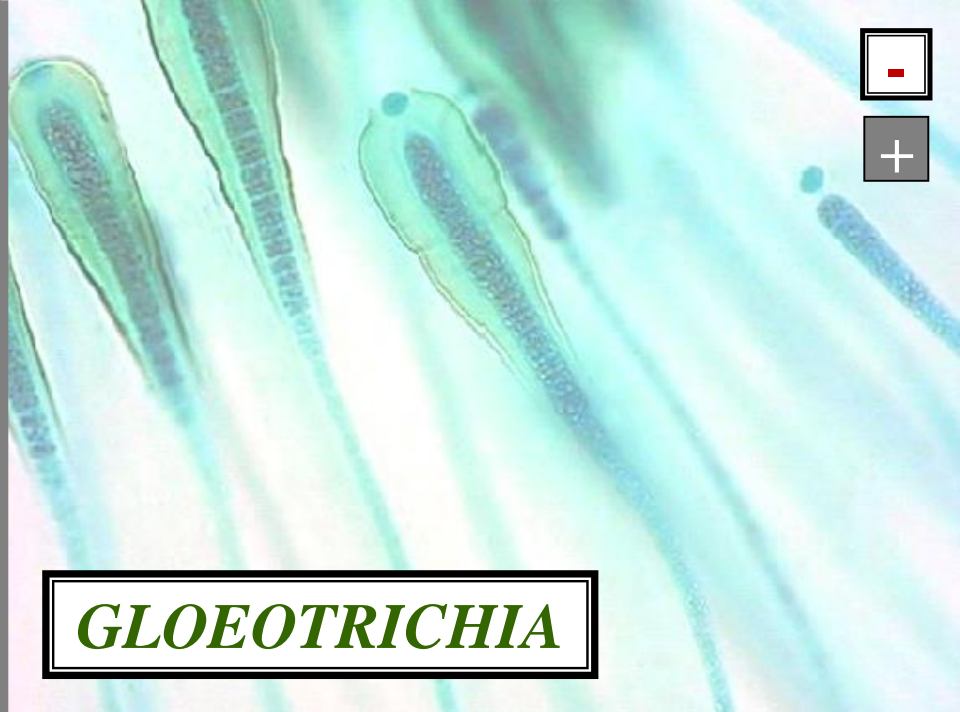
 = PEPTIDOGLYCANS

 = LIPOPOLYSACCHARIDES – **PRESENT**

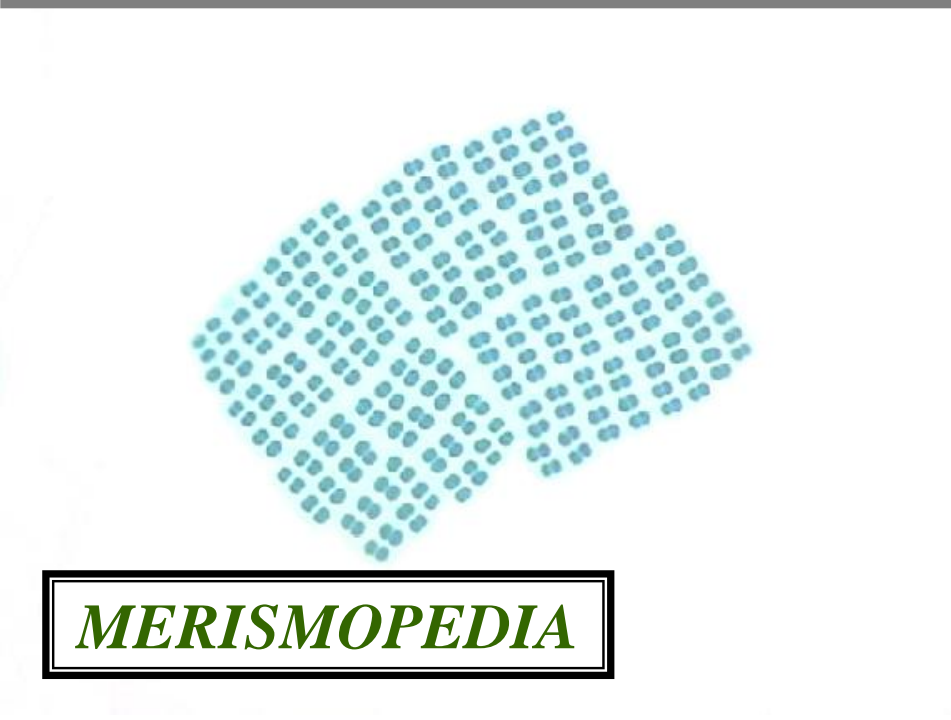




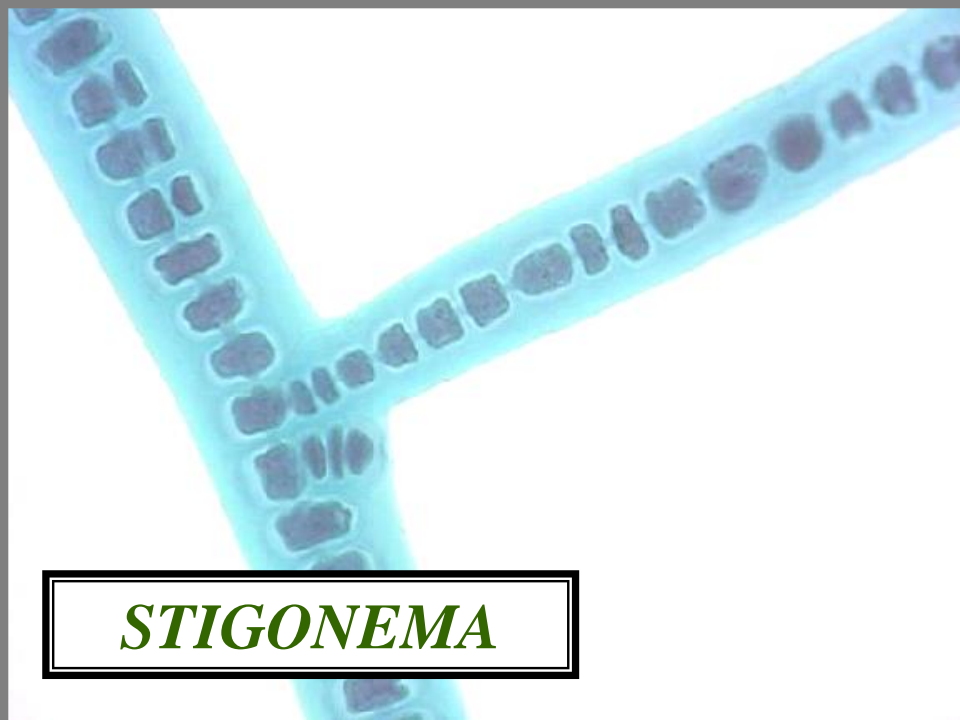
ANABAENA



GLOEOTRICHIA



MERISMOPEDIA



STIGONEMA



**GRAM –
BACTERIA**

ANABAENA



**GRAM –
BACTERIA**

GLOEOTRICHIA



**GRAM –
BACTERIA**

MERISMOPEDIA



**GRAM –
BACTERIA**

STIGONEMA

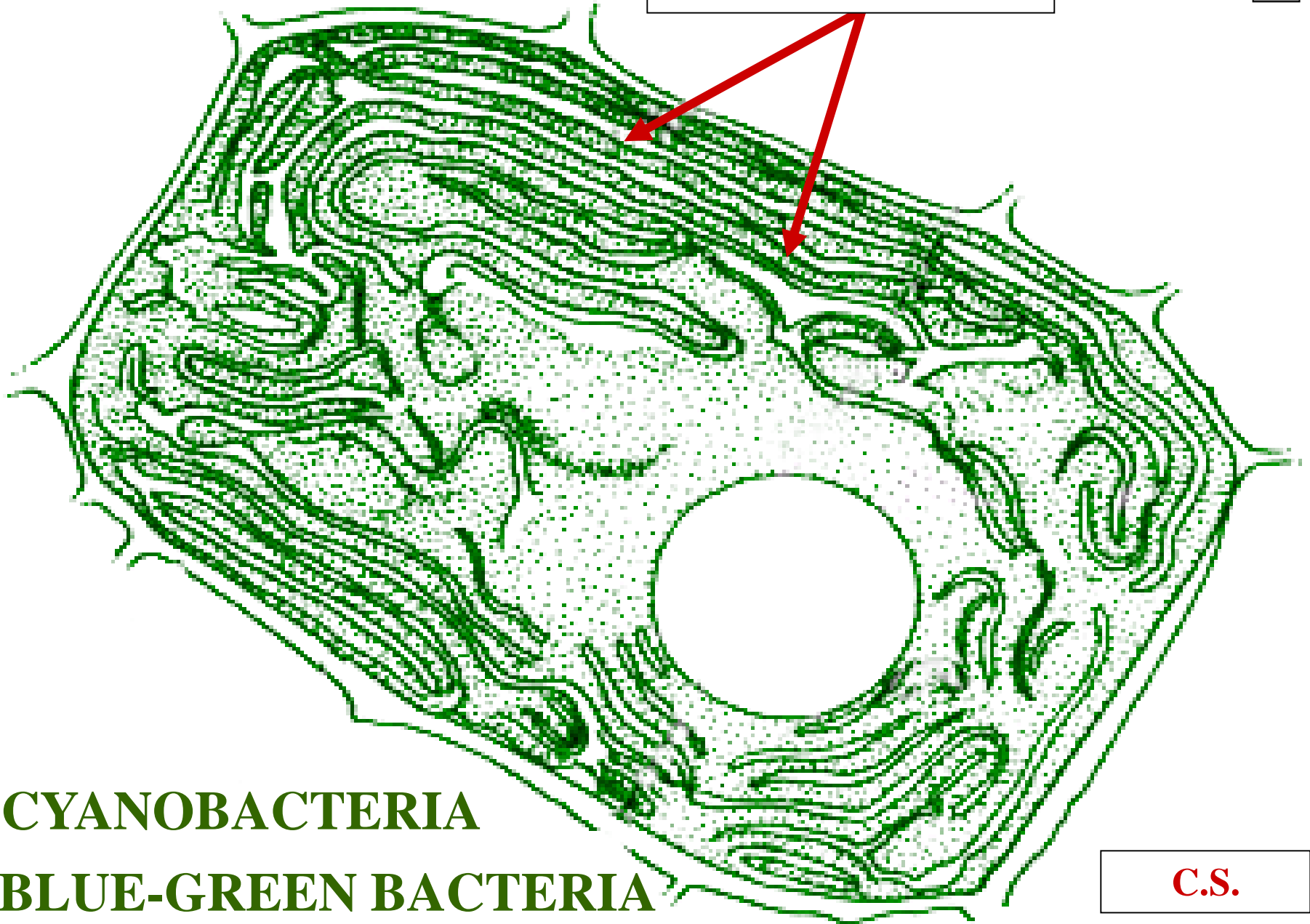


CELL MEMBRANE

CYANOBACTERIUM

CELL MEMBRANE

?



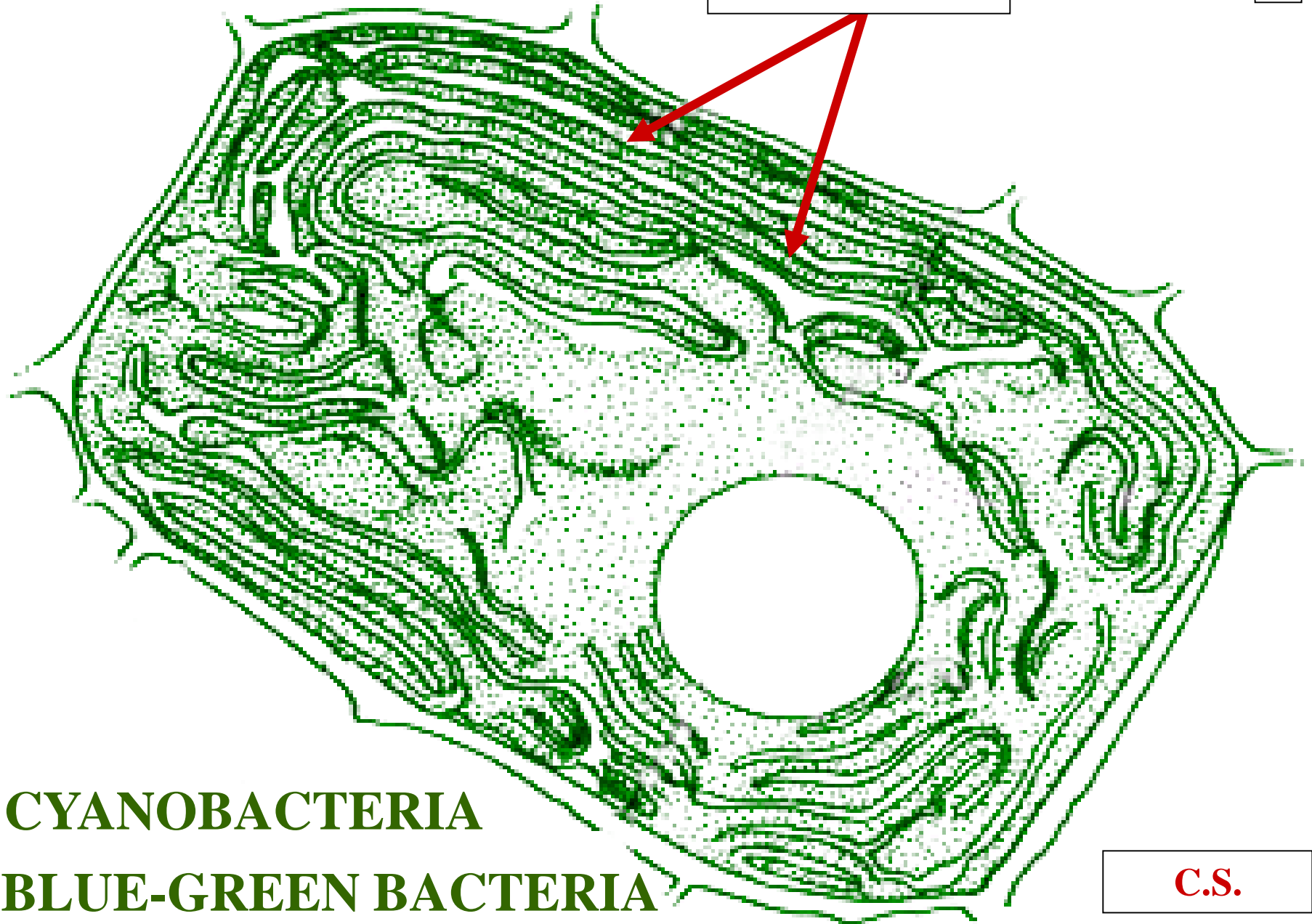
CYANOBACTERIA

BLUE-GREEN BACTERIA

C.S.

CYANOBACTERIUM

M



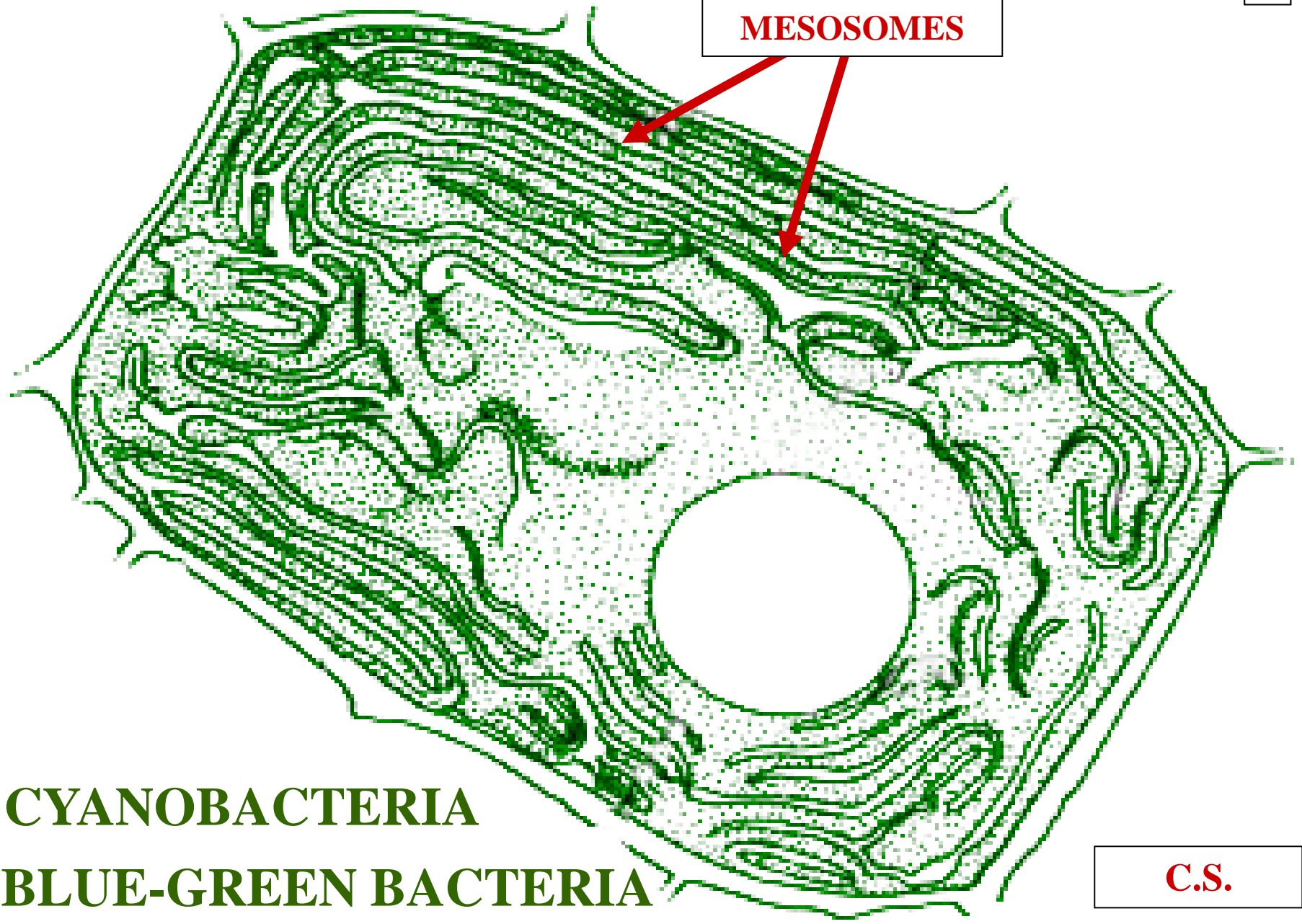
CYANOBACTERIA
BLUE-GREEN BACTERIA

C.S.

CYANOBACTERIUM

T

EXTENSIVE
MESOSOMES



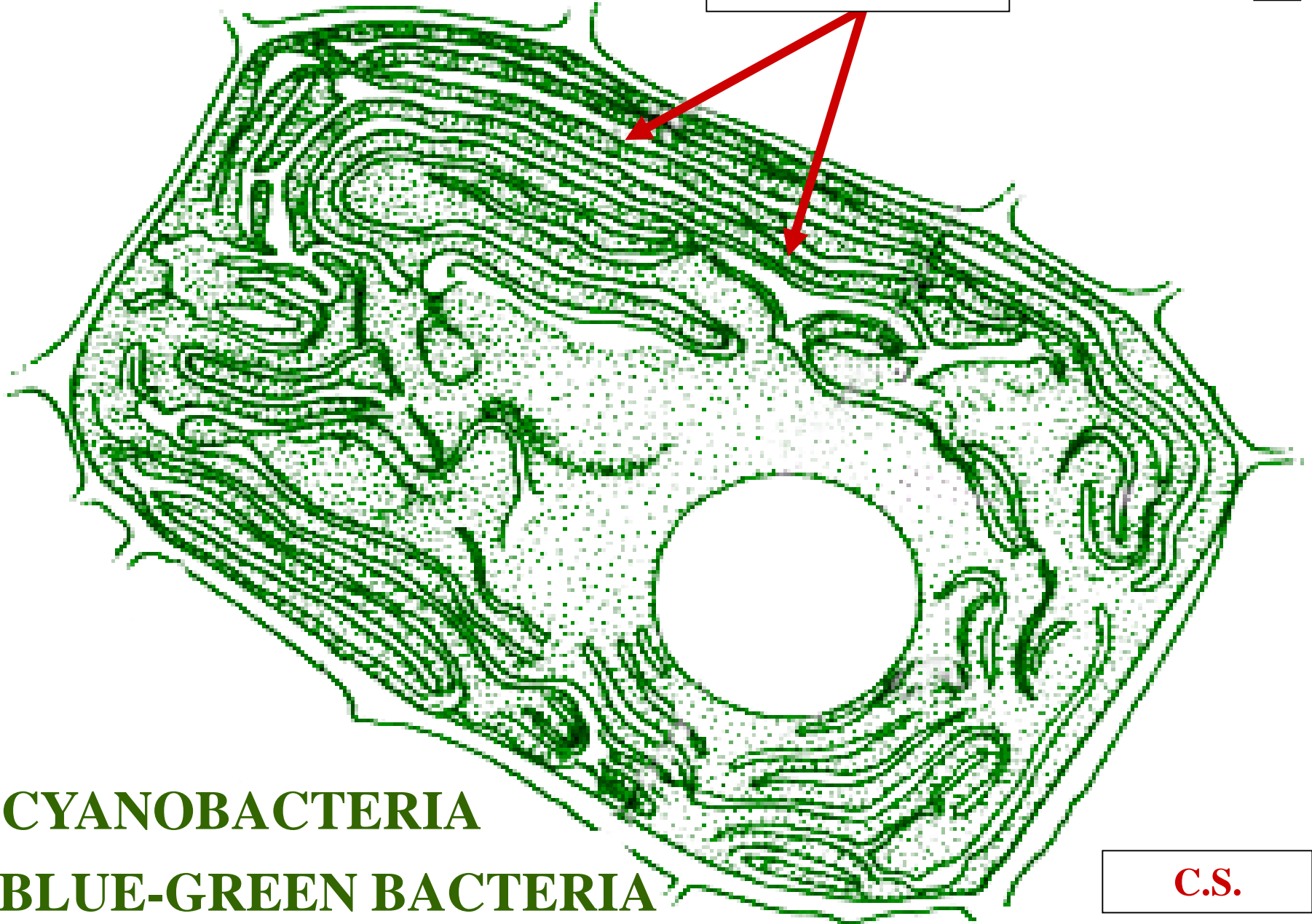
CYANOBACTERIA
BLUE-GREEN BACTERIA

C.S.

CYANOBACTERIUM

THYLAKOID

T



CYANOBACTERIA
BLUE-GREEN BACTERIA

C.S.

THYLAKOID