



140 MIC

Lab 9 (Microorganisms)

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2017

Grouping of organisms into kingdoms is based on 3 factors :

1

Cell Type (prokaryotic or eukaryotic)

2

Cell Number (unicellular or multicellular)

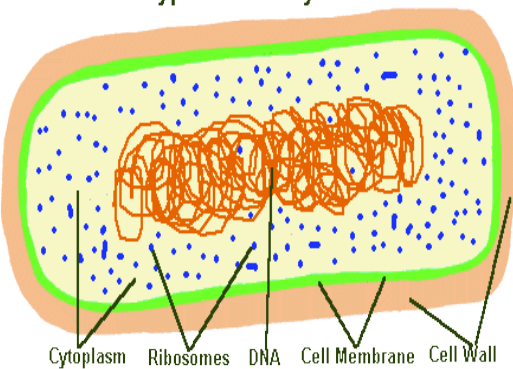
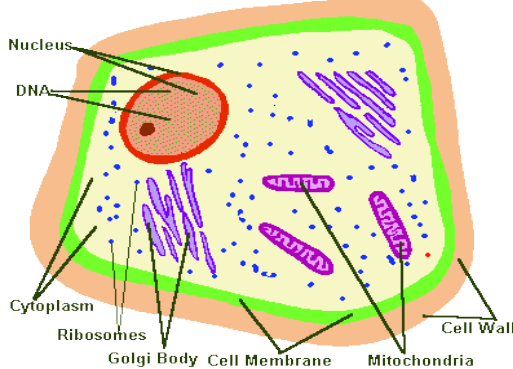
3

Feeding Type (autotroph or heterotroph)

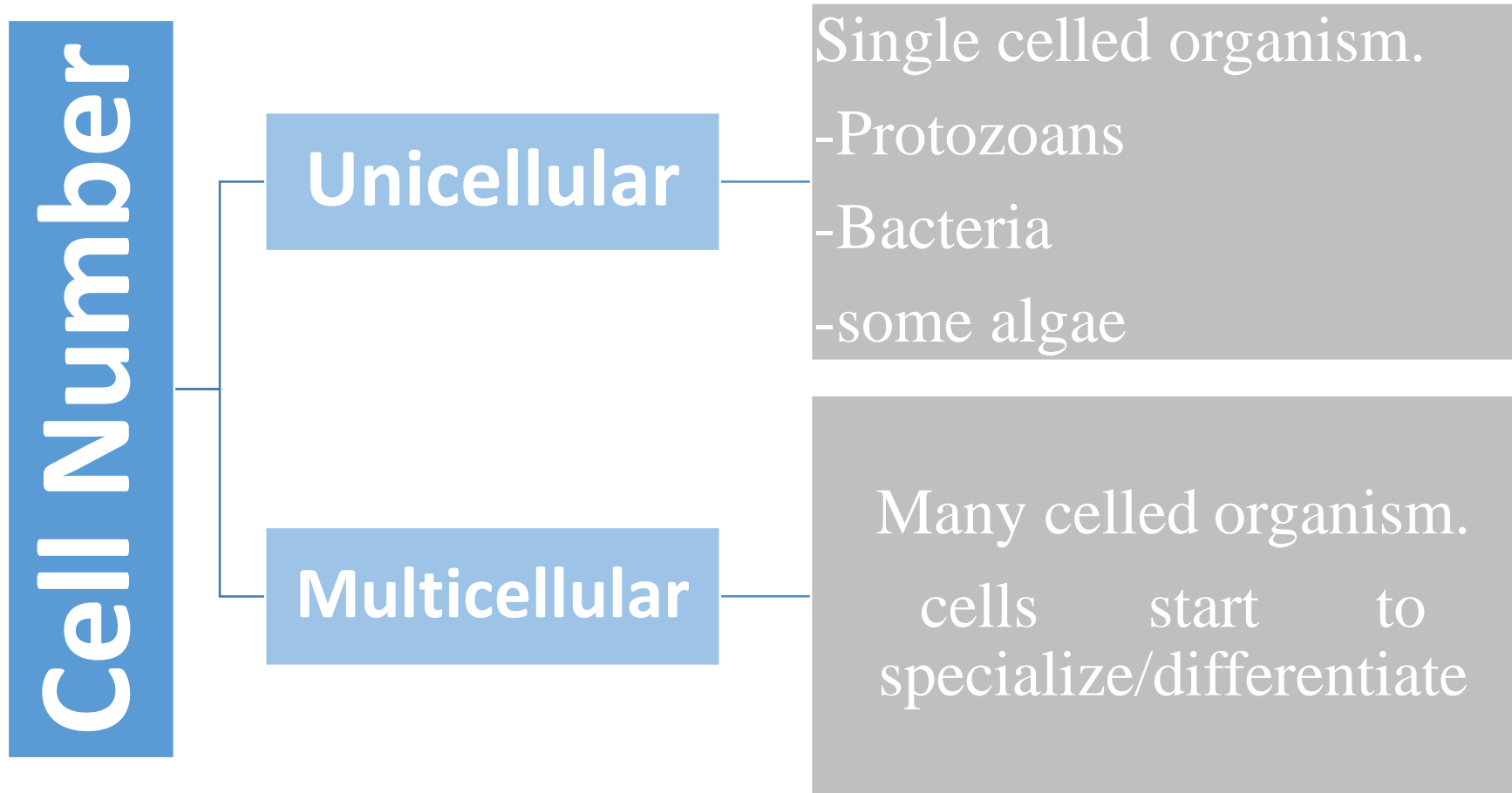
1st : Cell Type

- The presence or absence of cellular structures such as the nucleus, mitochondria, or a cell wall

1st : Cell Type

Prokaryotes	Eukaryotes
Bacteria, Cyanobacteria	Fungi, Animal
Do not have : <ul style="list-style-type: none">•An organized nucleus•Structured organelles	Do have : <ul style="list-style-type: none">•Nucleus organized with a membrane other organelles
<p data-bbox="573 835 853 863">A Typical Prokaryote Cell</p>  <p data-bbox="496 1199 955 1228">Cytoplasm Ribosomes DNA Cell Membrane Cell Wall</p>	<p data-bbox="1567 835 1872 863">A Typical Eukaryote Cell</p>  <p data-bbox="1554 1199 2063 1228">Nucleus DNA Cytoplasm Ribosomes Golgi Body Cell Membrane Mitochondria Cell Wall</p>

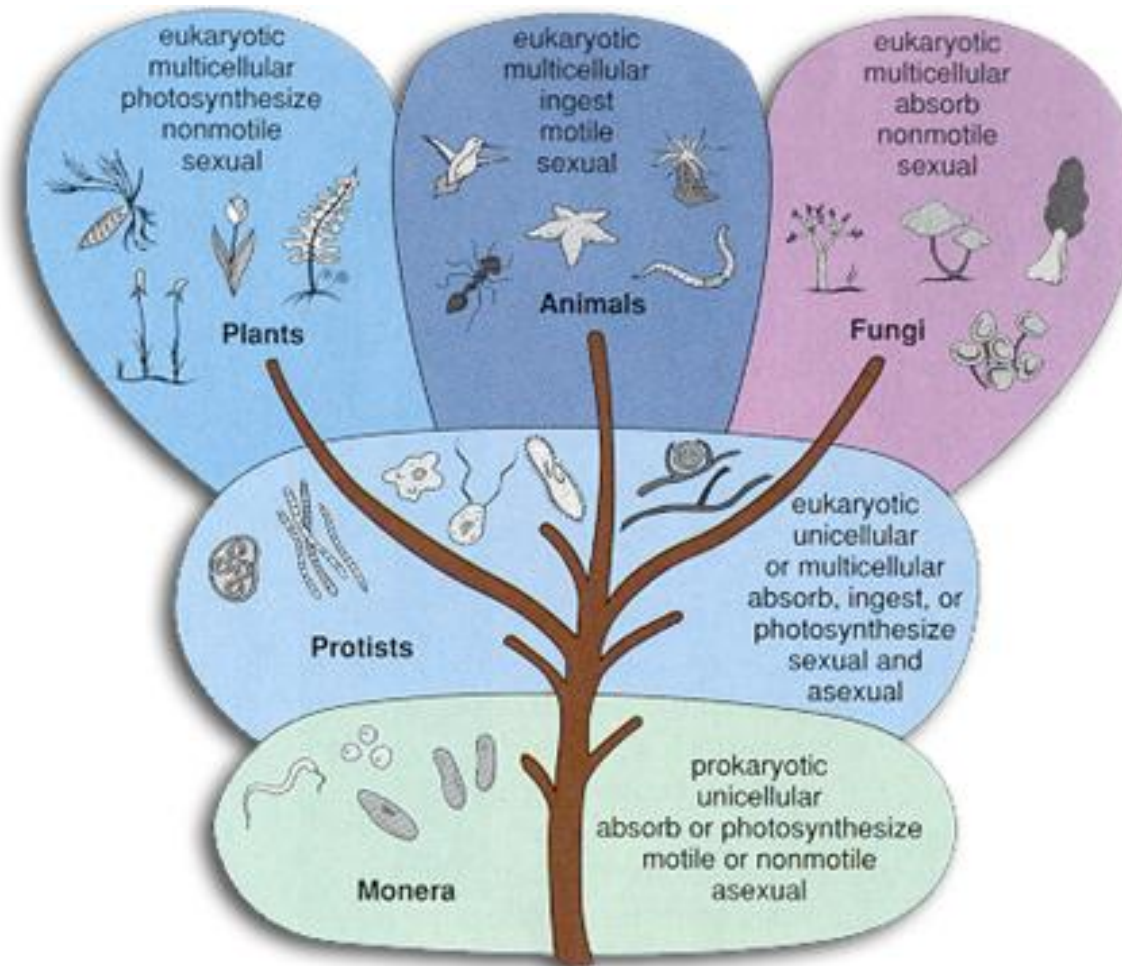
2nd : Cell Number

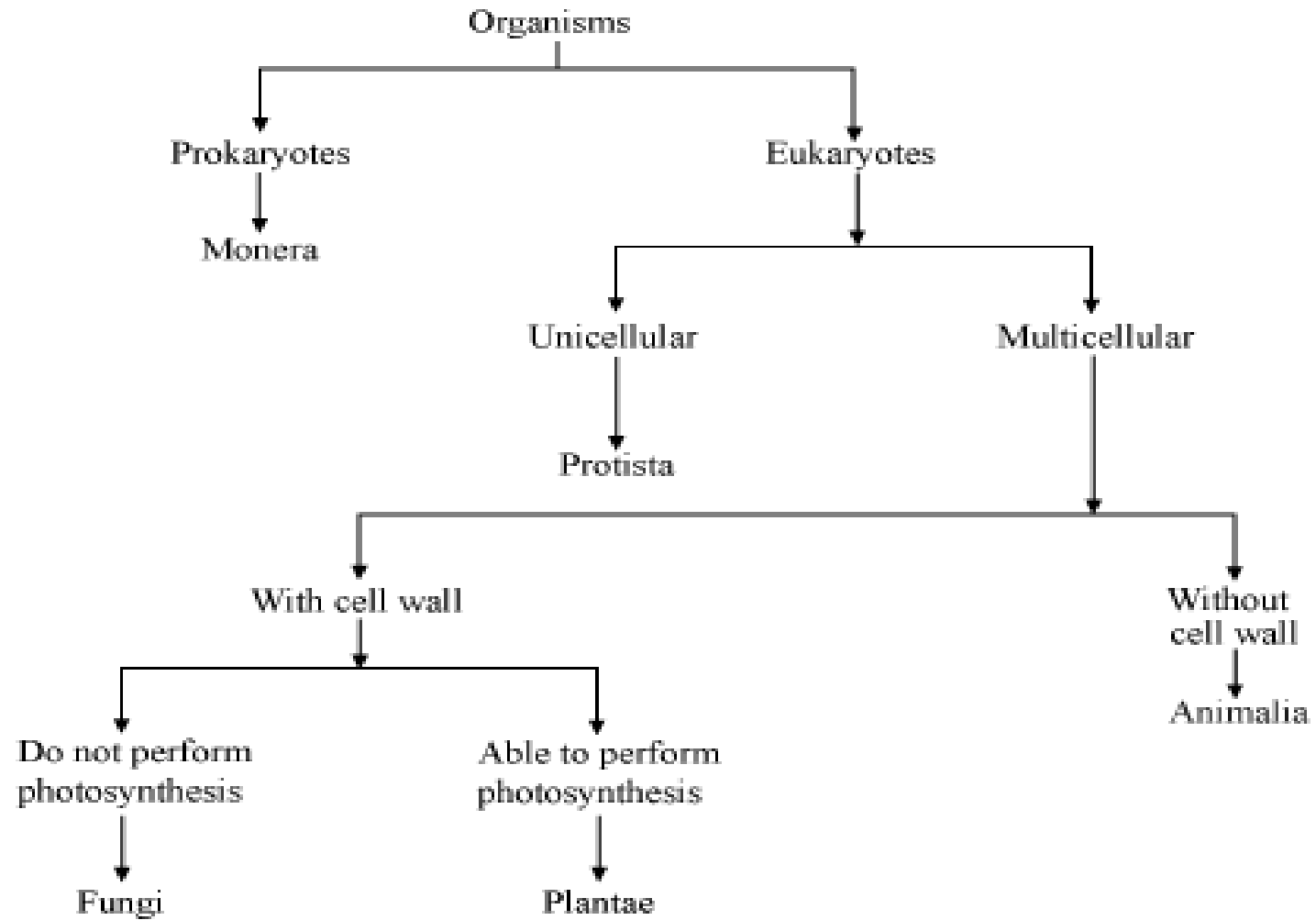


3rd : Feeding Type

How the organisms get their food?	
Autotroph or Producer	Heterotroph or Consumer
Make their own food	<ul style="list-style-type: none">• Must eat other organisms to survive• Includes decomposers – those that eat dead matter!
Plant, Cyanobacteria	Animal, Human

The Five-Kingdom System of Classification

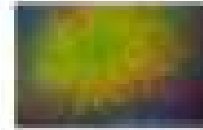




Whittaker's 5 kingdoms

Organisms

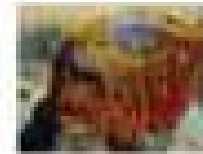
Monera
Prokaryotes | Unicellular



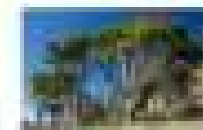
Protista
Eukaryotes | Unicellular



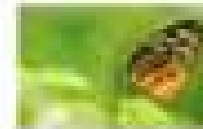
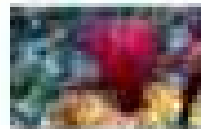
Fungi
Eukaryotes | Multicellular
With cell wall
Don't perform photosynthesis



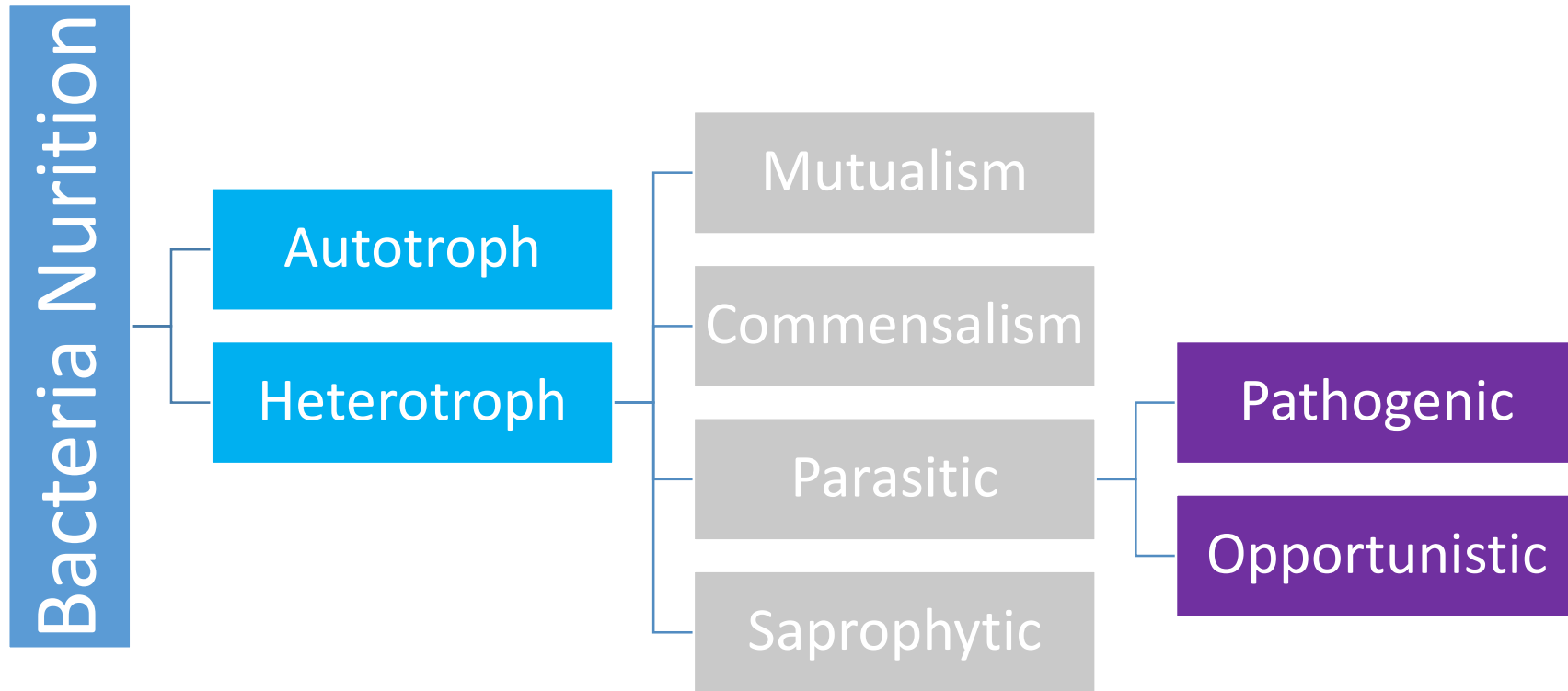
Plantae
Eukaryotes | Multicellular
With cell wall
Perform photosynthesis



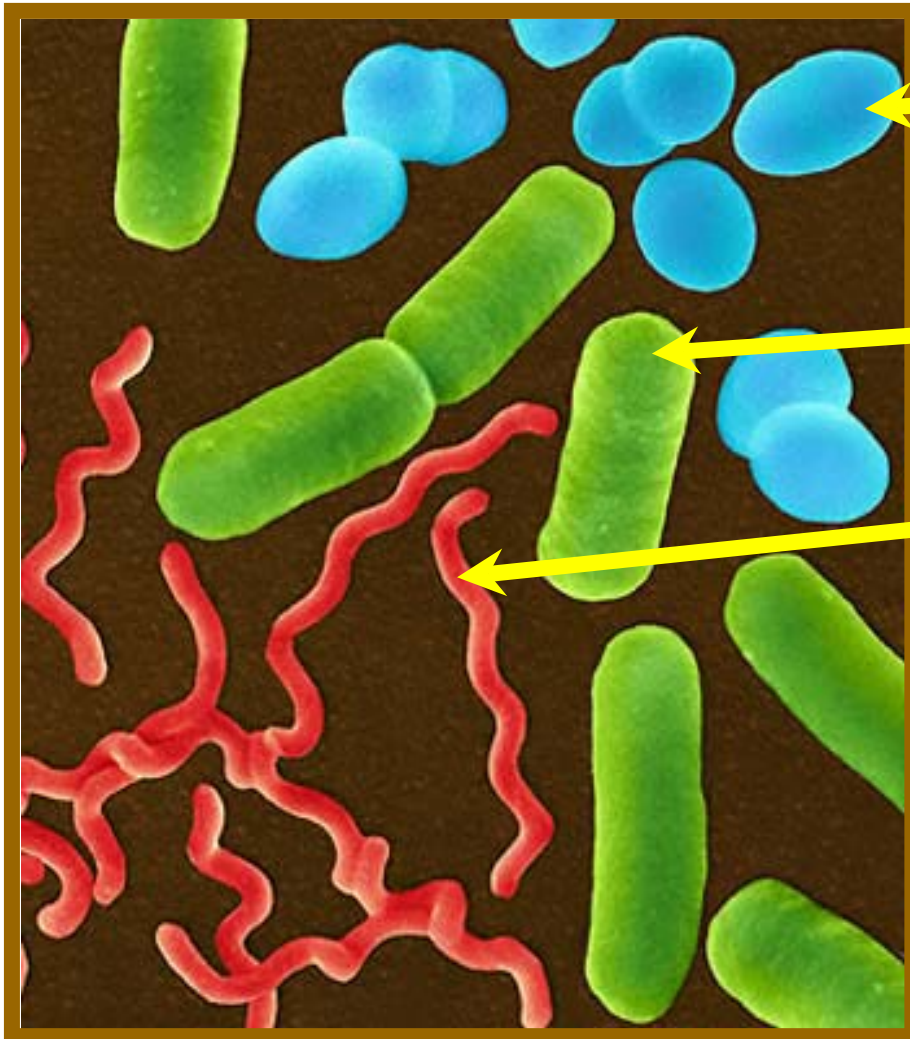
Animalia
Eukaryotes | Multicellular
No cell wall



❖ 1st : MoneraKingdome (Bacteria)



Bacterial Morphology



Coccus .1

Bacillus .2

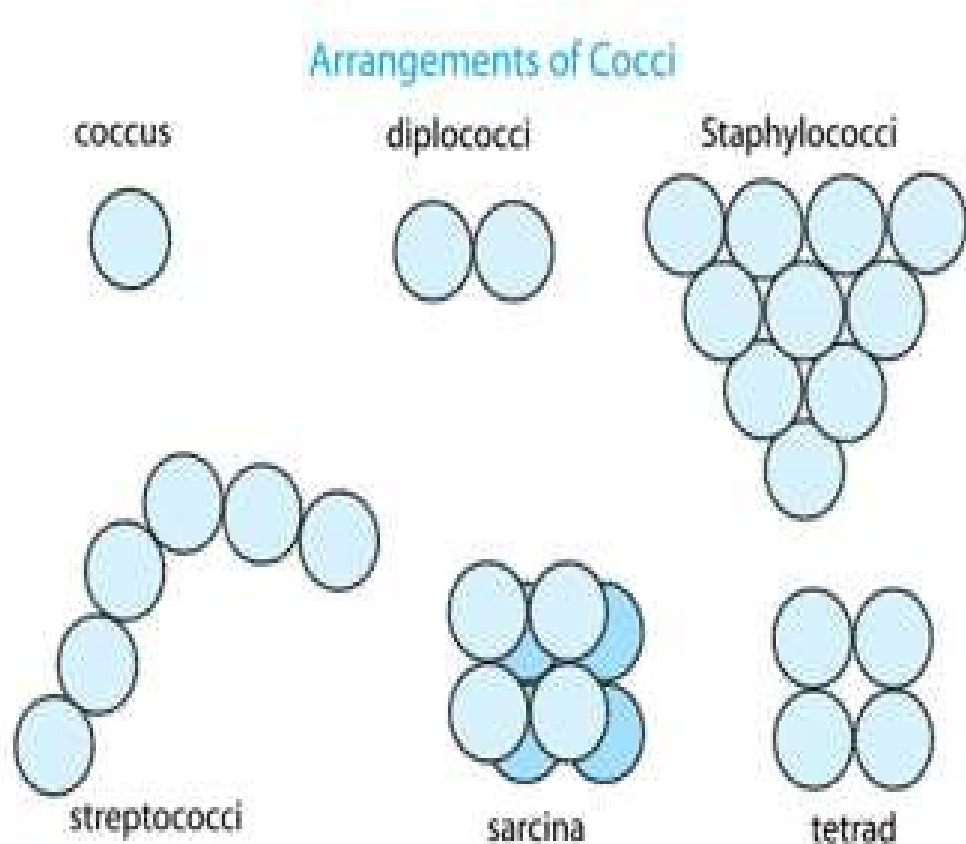
Spirillum .3

Filamentous .4

Aggregation System

- **Mono-**
- **Diplo-**
- **Strepto-**
- **Staphylo-**

1. Cocci



For example :

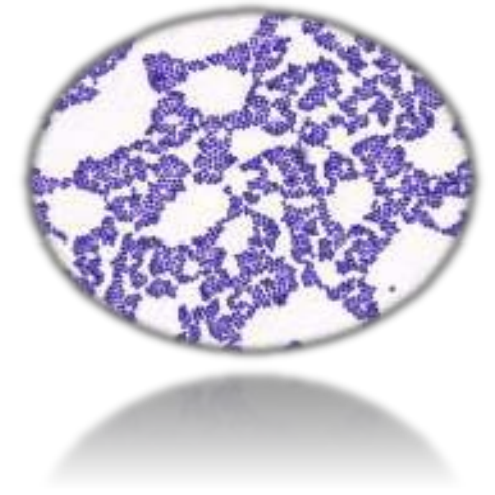
Staphylococcus aureus

Shape : cocci

Arrangement : cluster
(staph)

**Reaction with
gram stain :** Positive
(purple).

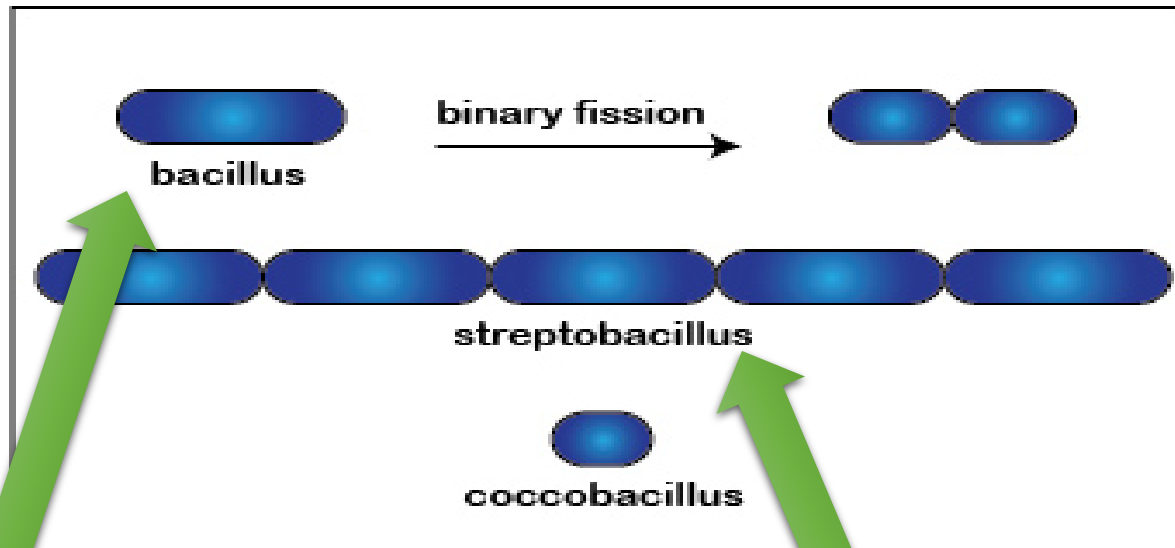
Disease : skin infection.



2- Bacillus

أنظمة التجمع المختلفة لخلايا البكتيريا
العصوية

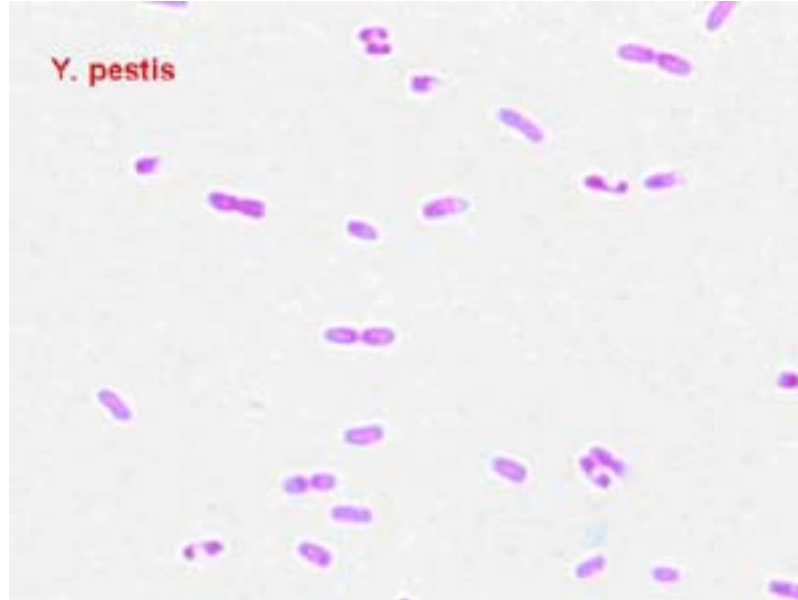
Arrangement of bacilli



مفردة
Mono-

في سلاسل
Strepto-

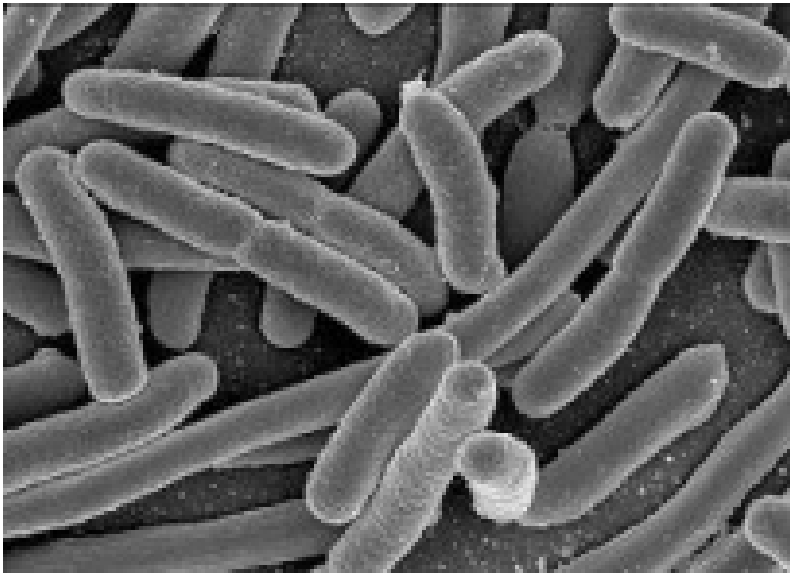
2- Bacillus



مثل البكتيريا المسببة للظاعون
Plaque

Yersinia pestis

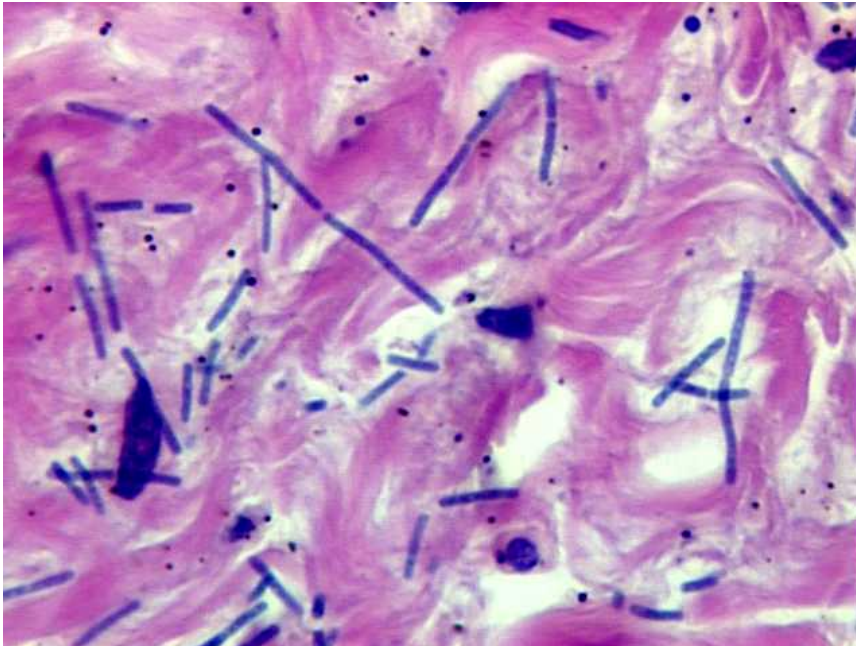
عصيات قصيرة سالبة الجرام



صورة الكتروميكروسكوبيه لبكتيريا عصويه قصيره
Electromicrograph of Short rods

بكتيريا القولون

Escherichia coli

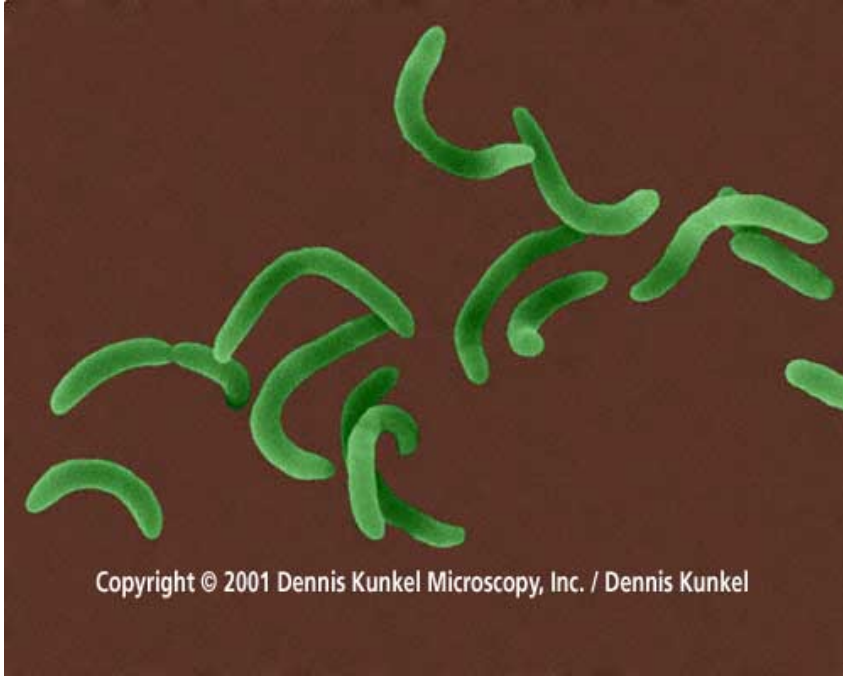


Bacilli Gram-positive bacteria
in chains

البكتيريا المسببة لمرض Anthrax

Bacillus anthracis

3- Spirillum

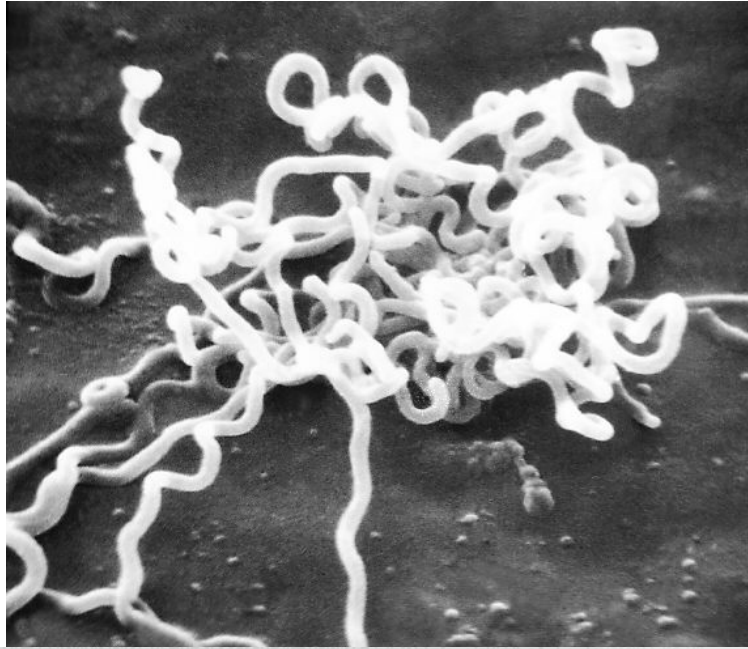


البكتيريا المسببة الكوليرا

Vibrio cholerae



4- Spirochete



البكتيريا المسببة لمرض الزهري
Syphilis

Treponema pallidum

G-ve bacteria

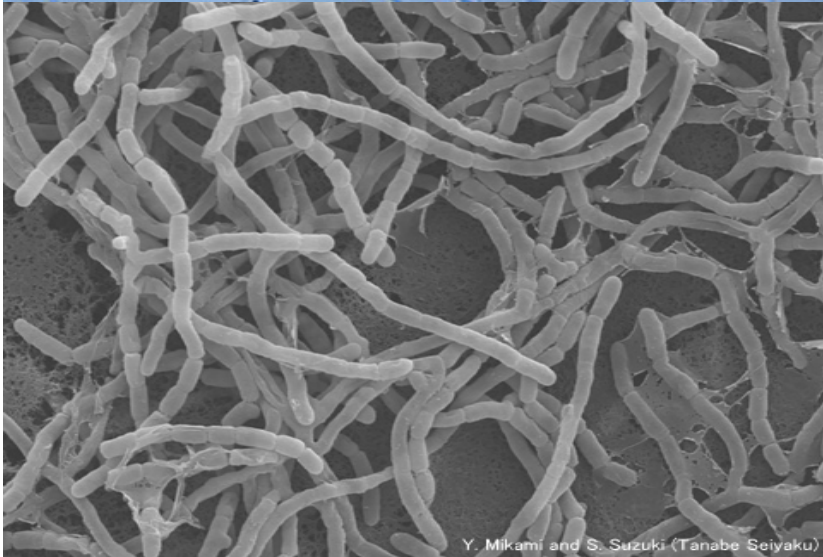


5- Filamentous (Actinomycetes)



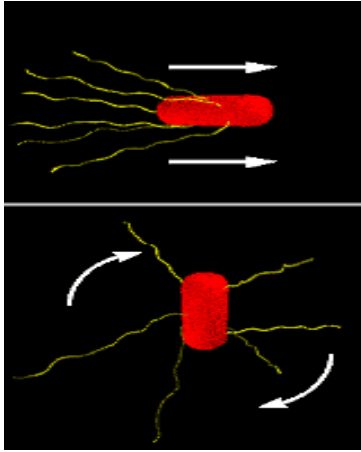
Branched bacilli

e.g. *Nocardia*



Y. Mikami and S. Suzuki (Tanabe Seiyaku)

Motility of Bacteria

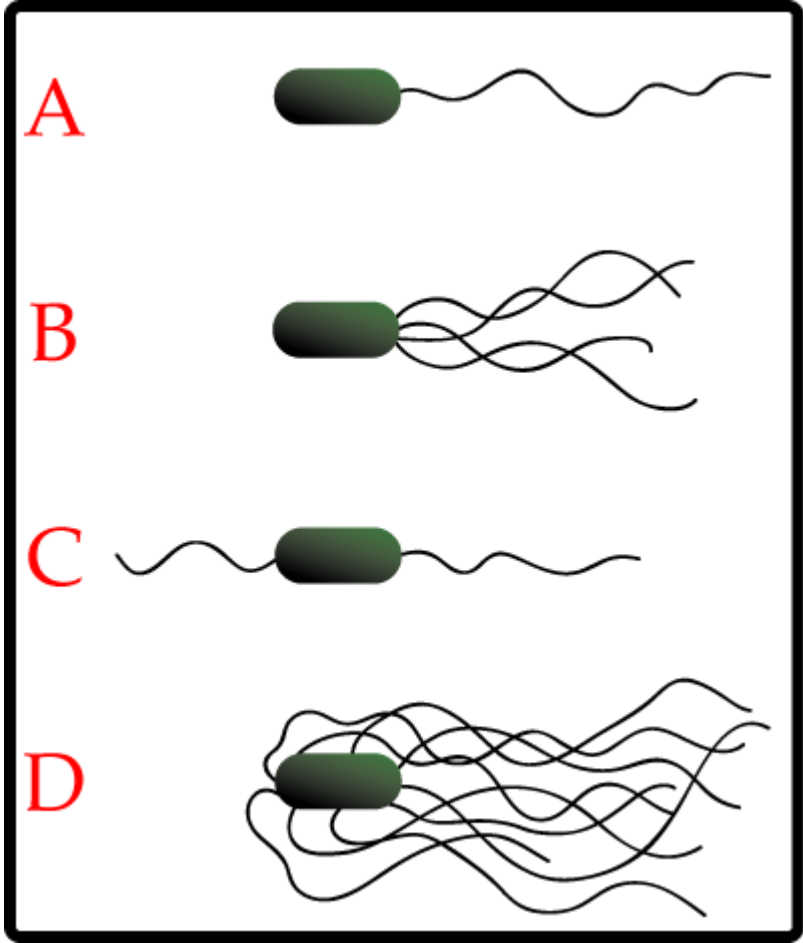


- بكتيريا غير متحركة:
مثل معظم البكتيريا الكرويه

- بكتيريا متحركة بواسطة:
Flagella (flagellum sn.) -
مثل : *Escherichia coli*



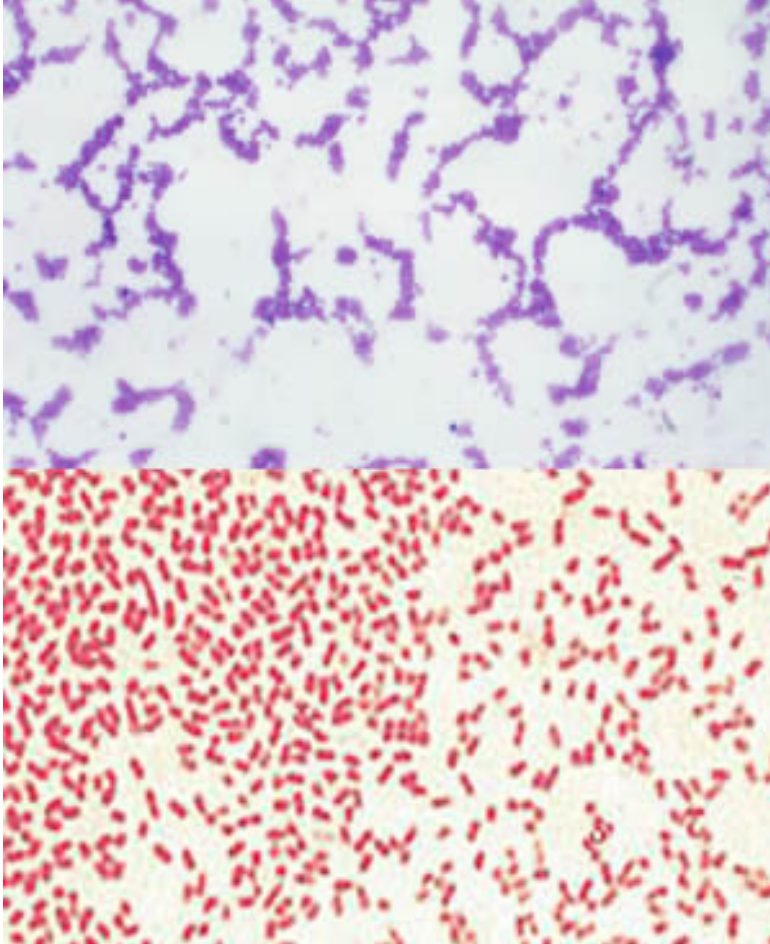
- الانزلاق Gliding
- (مثل *Myxobacteria*)



- A_ وحيدة السوط Monotrichous
B_ طرفية الأسواط Lophotrichous
C_ قطبية الأسواط Amphitrichous
D_ محيطية الأسواط Peritrichous

Response to Staining

تنقسم البكتيريا تبعاً لاستجابتها لصبغة جرام إلى:



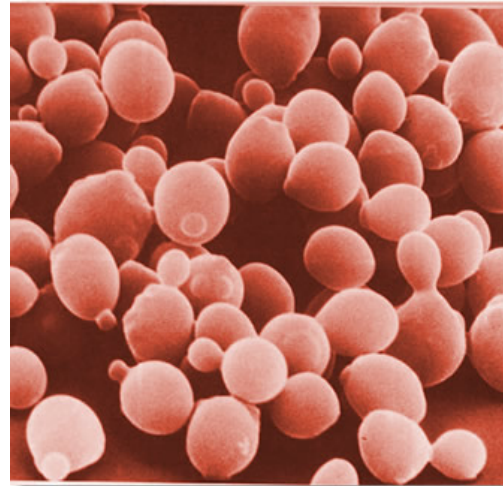
Gram-positive bacteria •
مثل: *Staphylococcus aureus*
وتكتسب اللون البنفسجي

Gram-negative bacteria •
مثل: *E. coli*
وتكتسب اللون الأحمر إلى الوردي

Fungi Kingdom

- All fungi are eukaryotic
- They may be unicellular or multicellular
- All fungi have a cell wall

Unicellular
(yeast)



Multicellular



classified by how they reproduce

1- Zygosporangium (الزيجية) :

Zygomycetes e.g. *Rhizopus* sp.

2- Ascomycetes (الأسكية) :

e.g. *Penicillium nutatum* , *Aspergillus niger*

، *Saccharomyces cerevisiae*

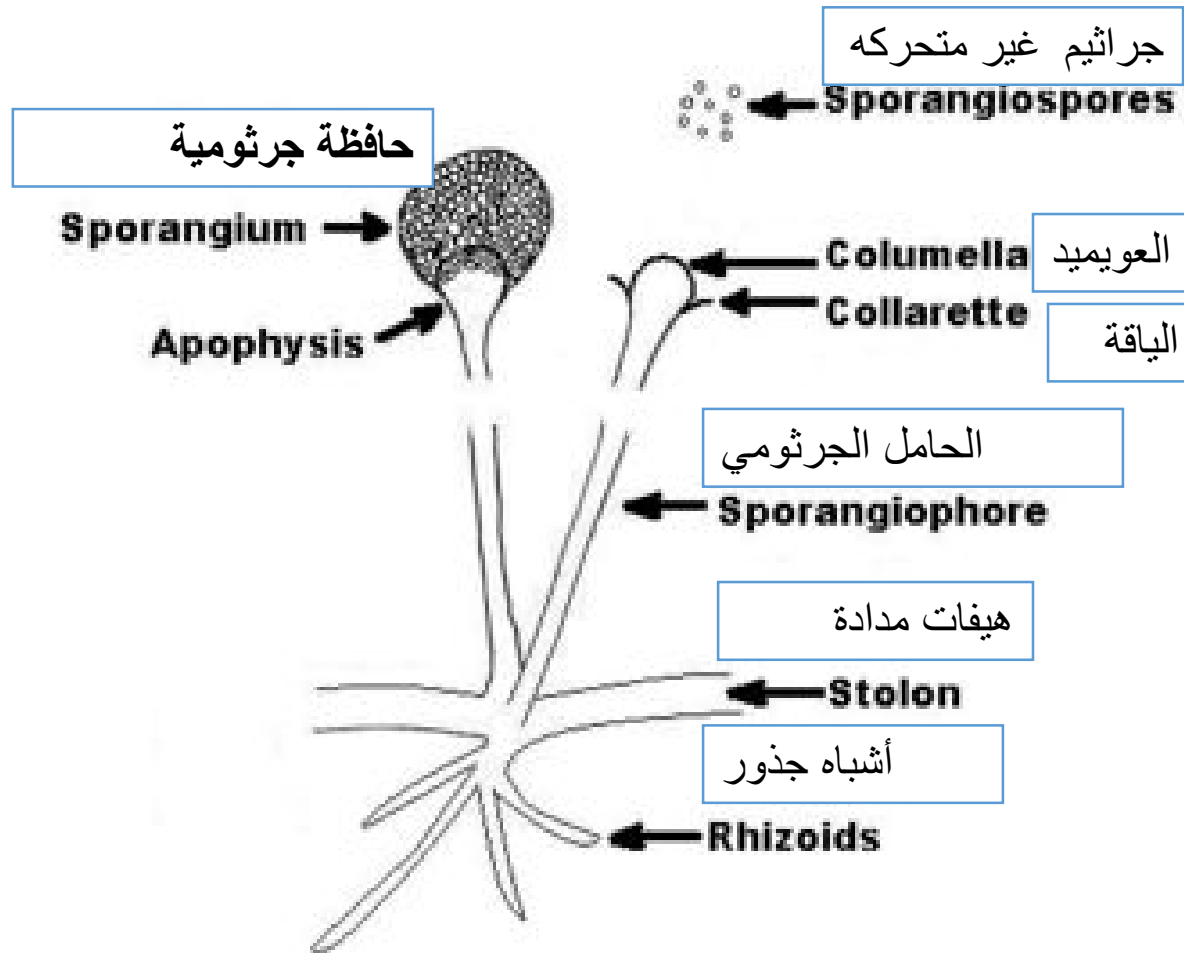
3- Basidiomycete (البازيدية) :

e.g. *Agaricus*

4- Deuteromycetes (الناقصة) :

e.g. *Fusarium*

فطر *Rhizopus*



فطر *Aspergillus*

Chains of Conidia

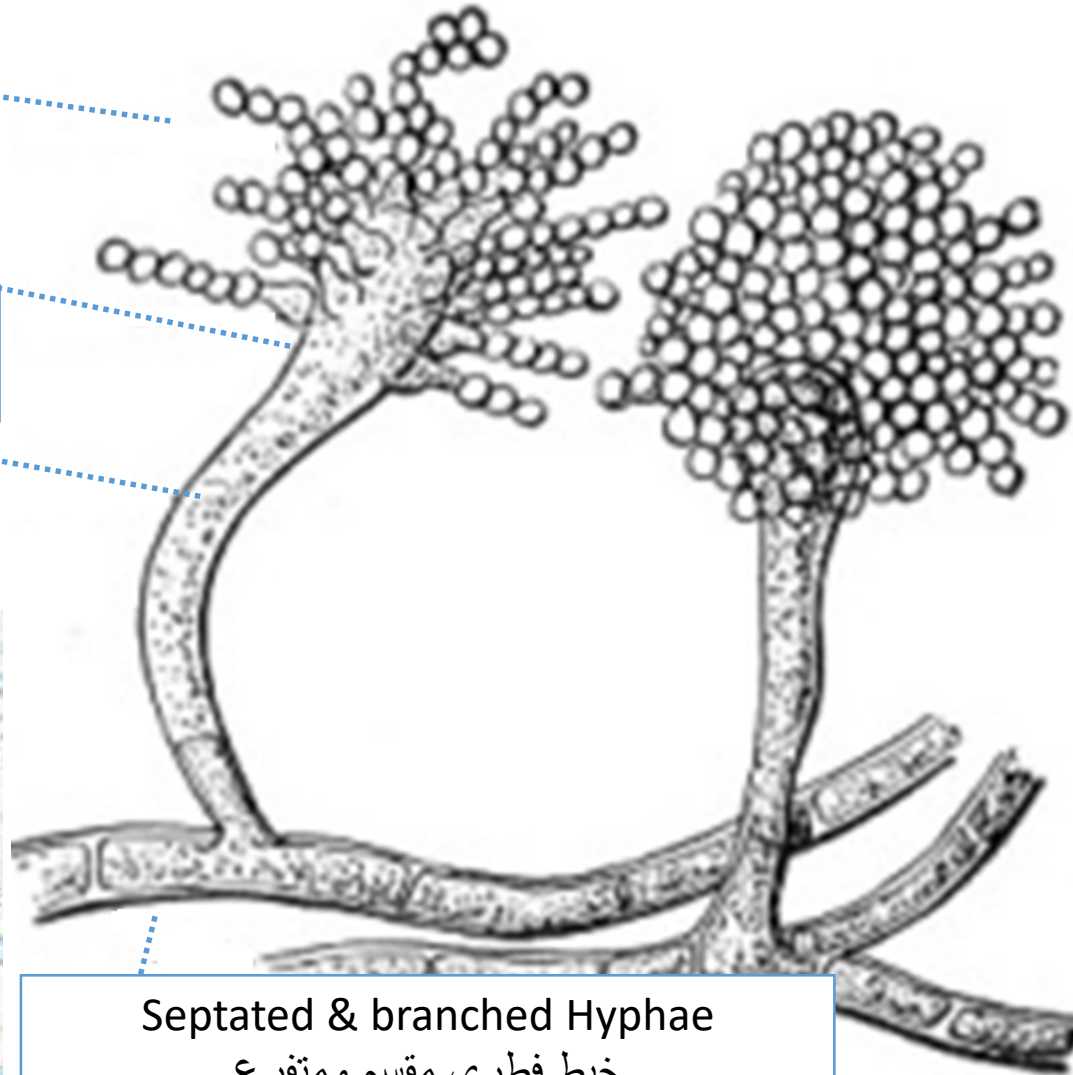
سلاسل من الجراثيم
الكونيدية

Vesicle

الحويصلة

Conidiophore

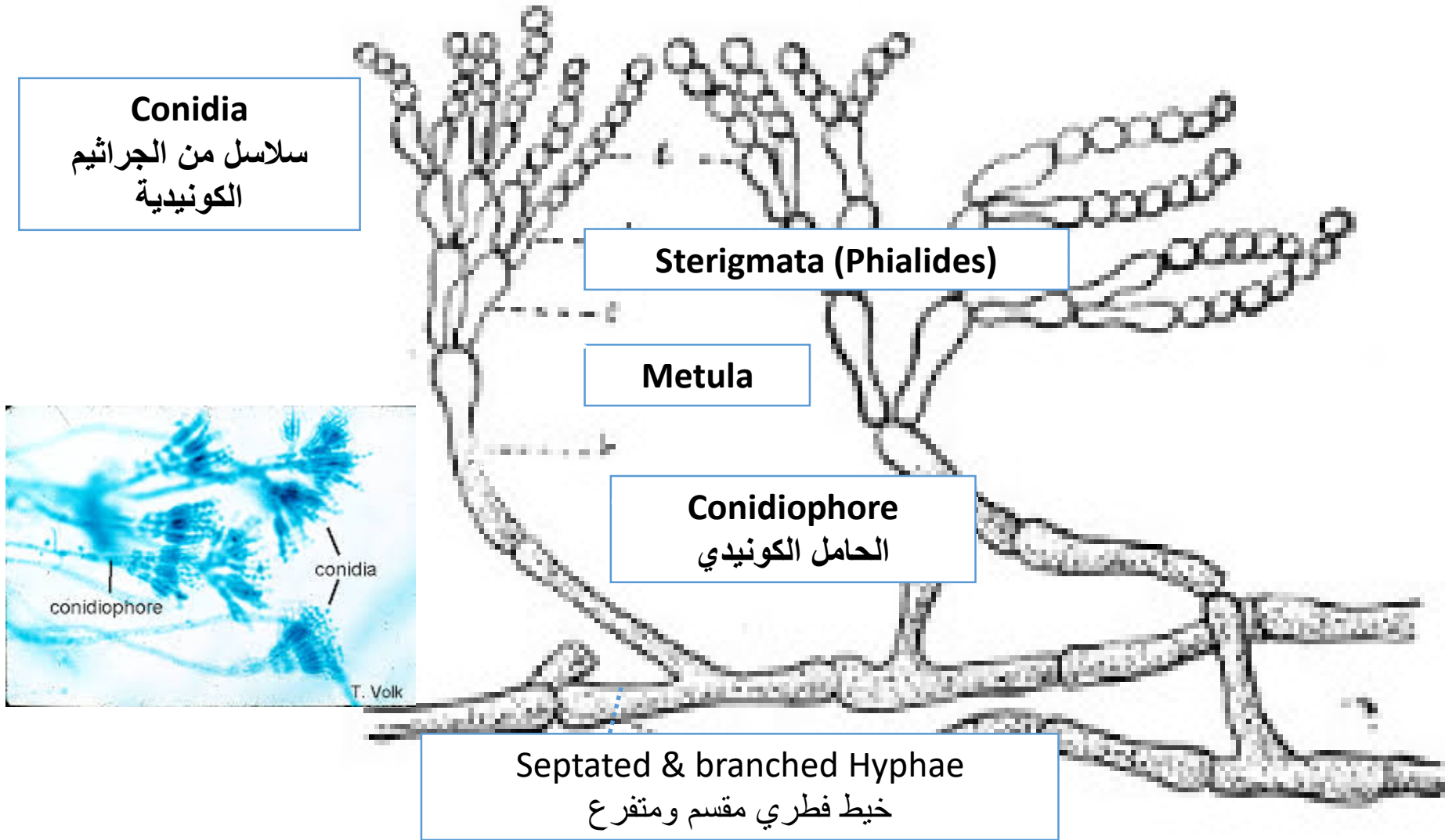
الحامل الكونيدي



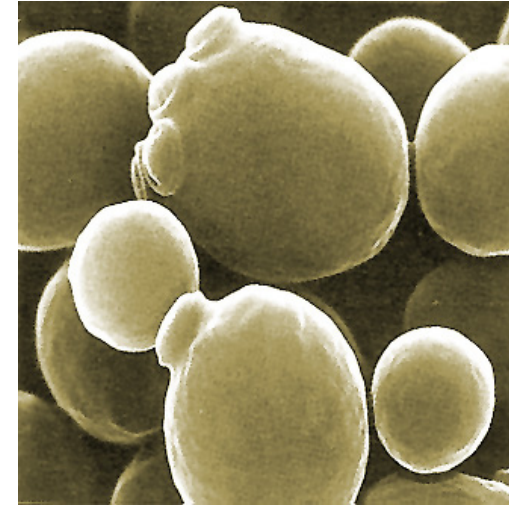
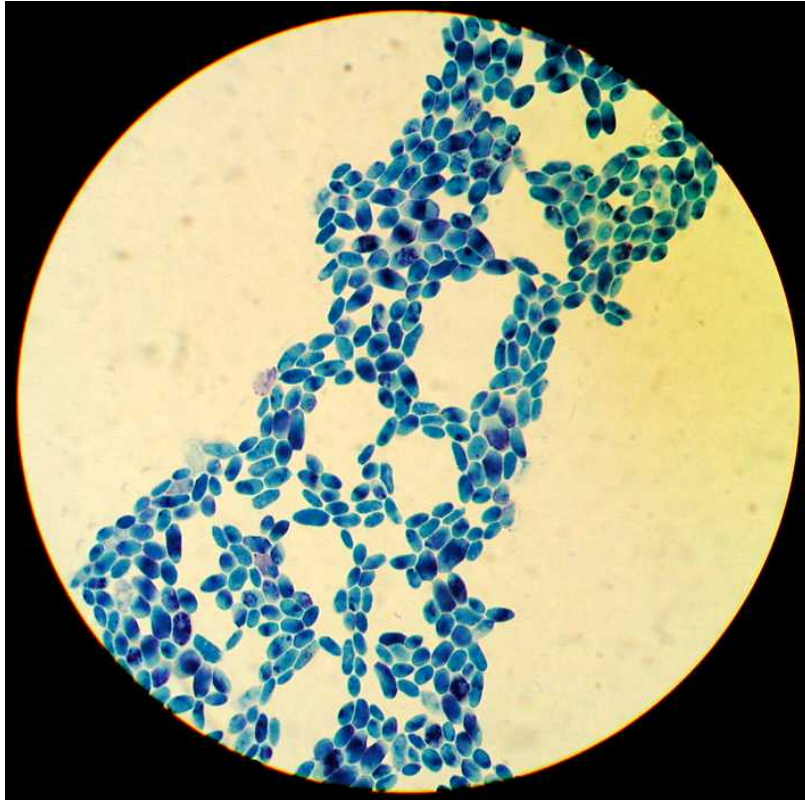
Septated & branched Hyphae

خيوط فطرية مقسمة ومتفرعة

فطر *Penicillium*

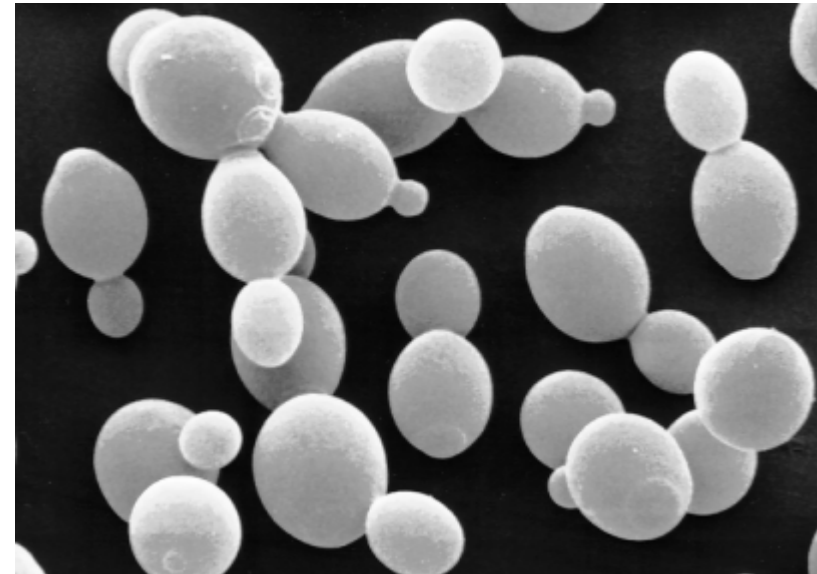
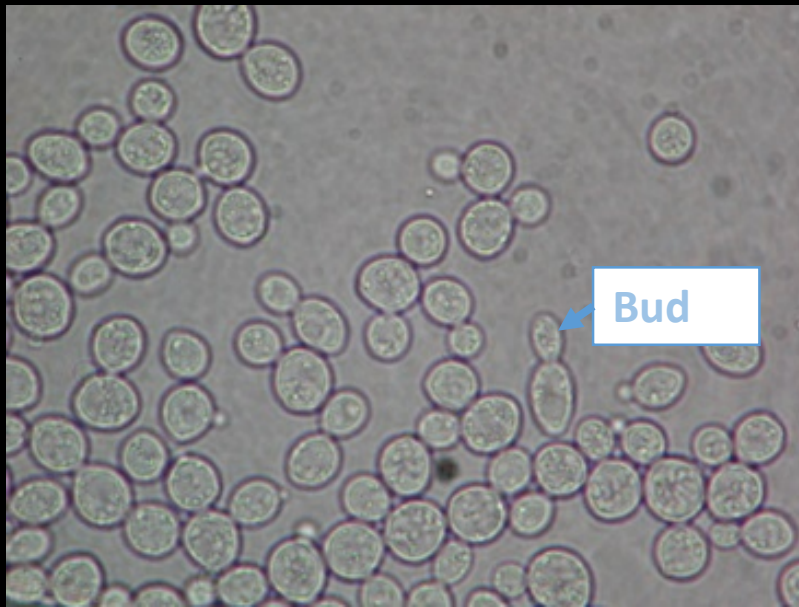


فطر *Saccharomyces*

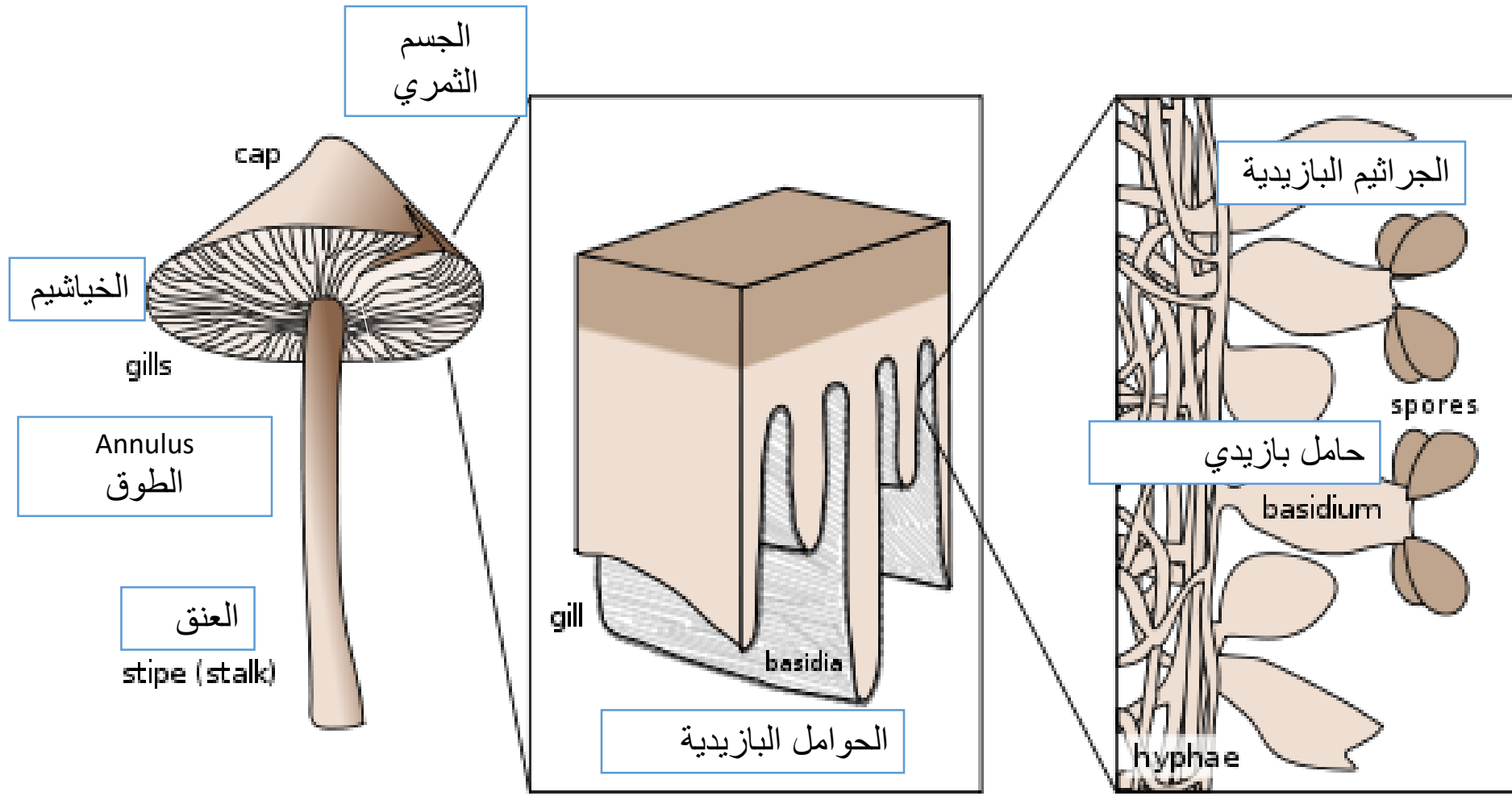


Saccharomyces فطر

**Asexual reproduction:
By Budding**



فطر Agaricus



3rd: Algae

Thallus

Contains Chlorophyll and other pigments

Autotrophs

Where can Algae live?

e.g. Nostoc

- In soil

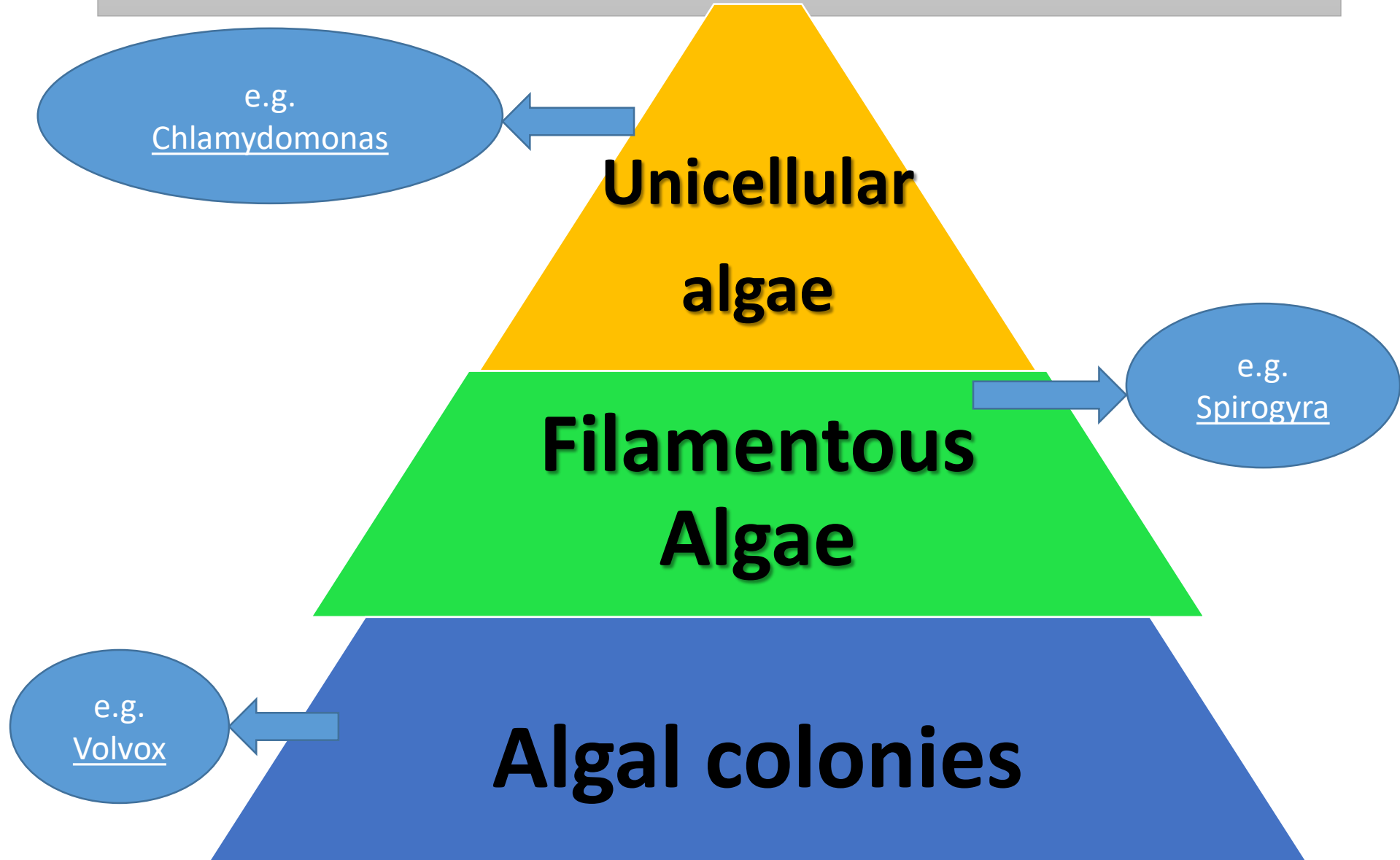
e.g. Diatoms

- In sea water

e.g. Volvox

- In fresh water

Structure

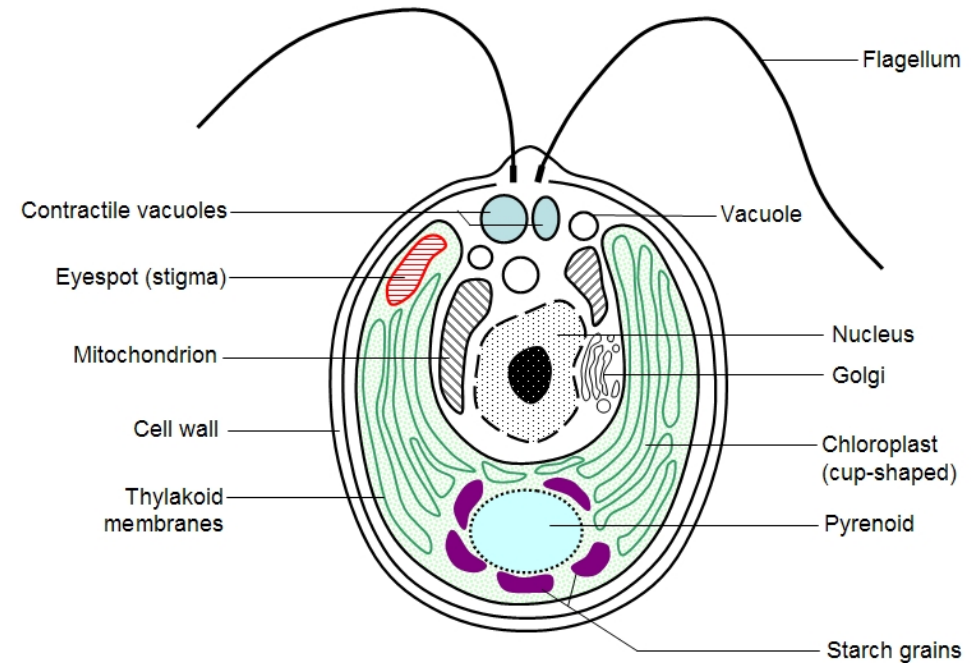


Example of unicellular motile alge



Chlamydomonas طحالب

Chlamydomonas



Algae Classification (Pigments inclusions)

1- Cyanophyta

2- Chlorophyta

3- Phaeophyta

4- Rhodophyta

5- Chrysophyta

6- Euglenophyta

7- Diatoms

1- Cyanophyta

مثل : طحلب *Nostoc*

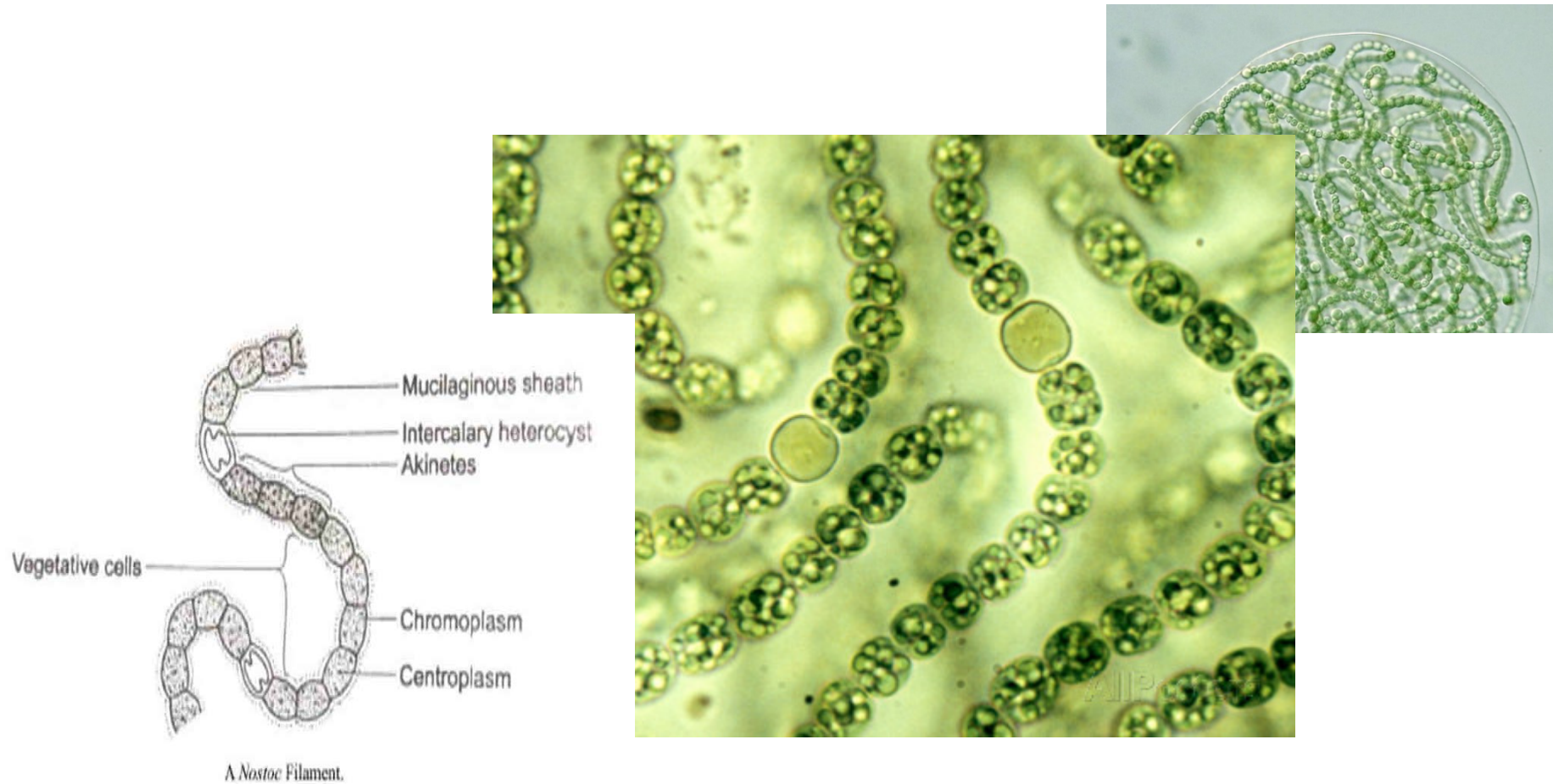


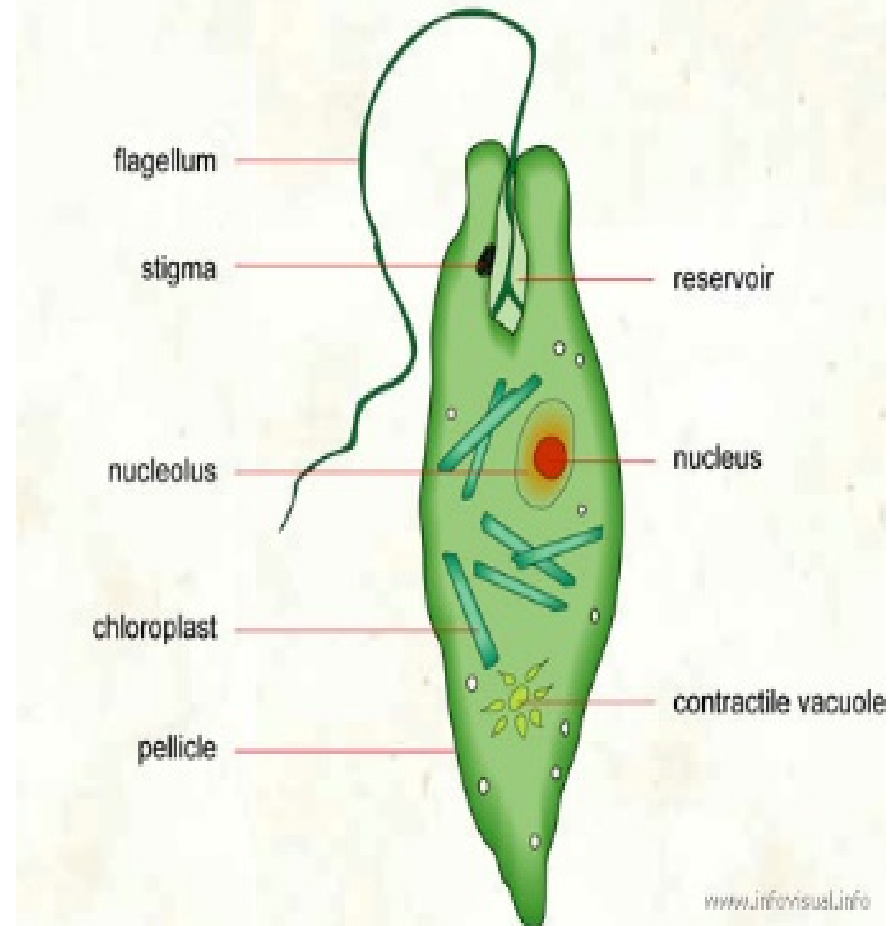
fig: nostoc filament

2- Cholorophyta

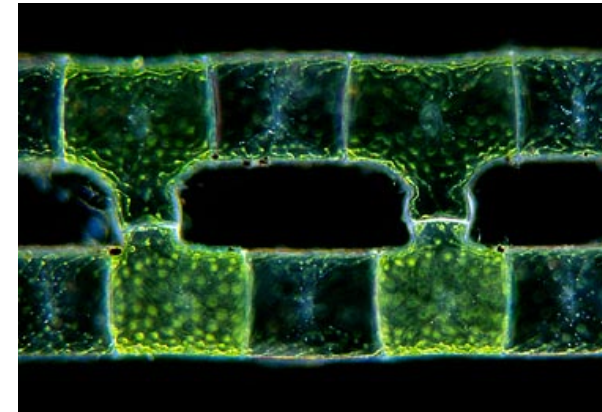
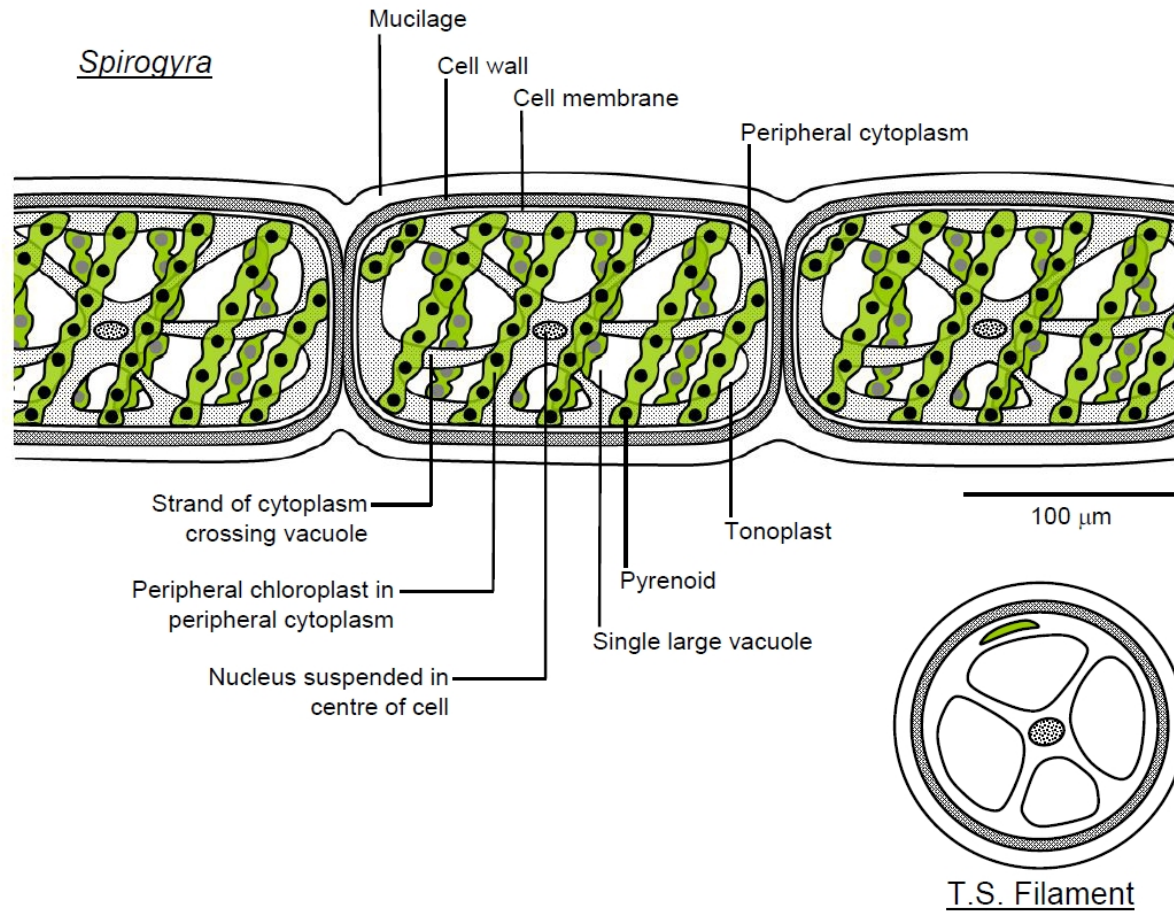
مثل: طحلب *Euglena*



STRUCTURE OF A EUGLENA



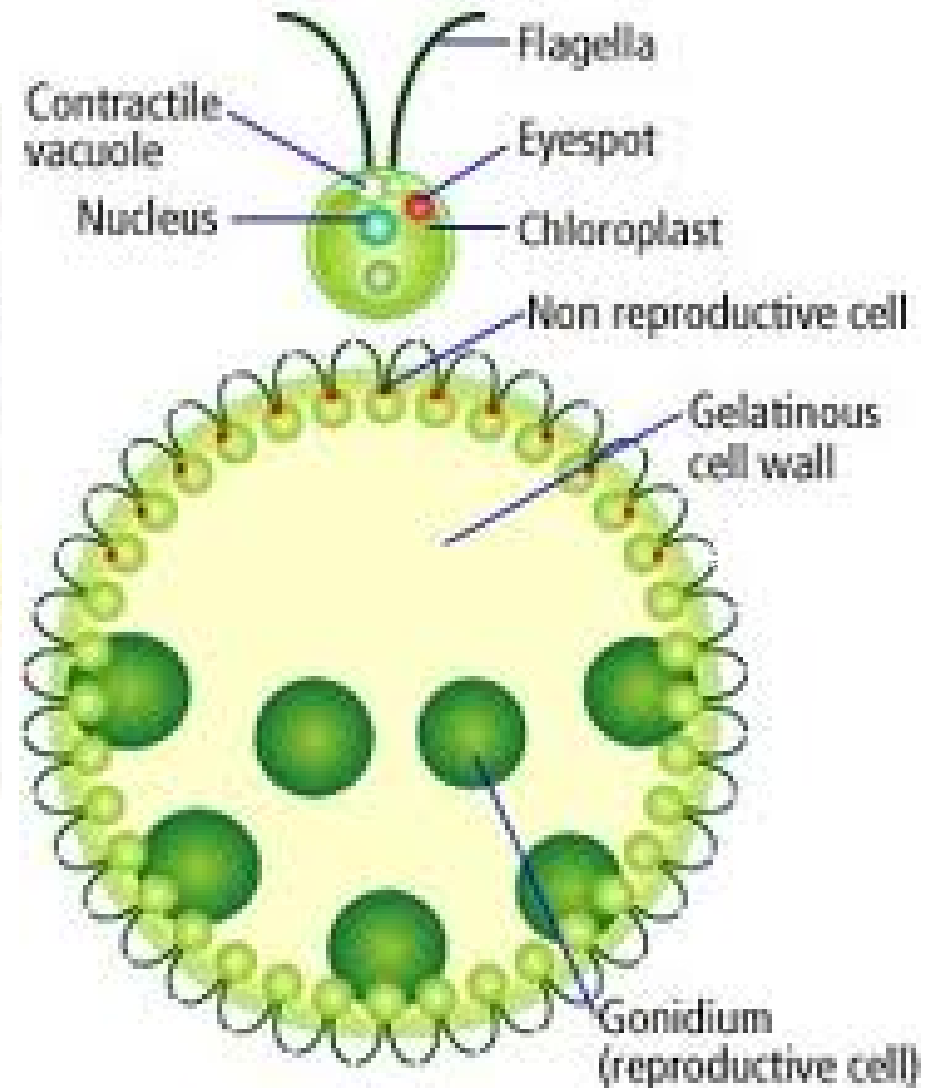
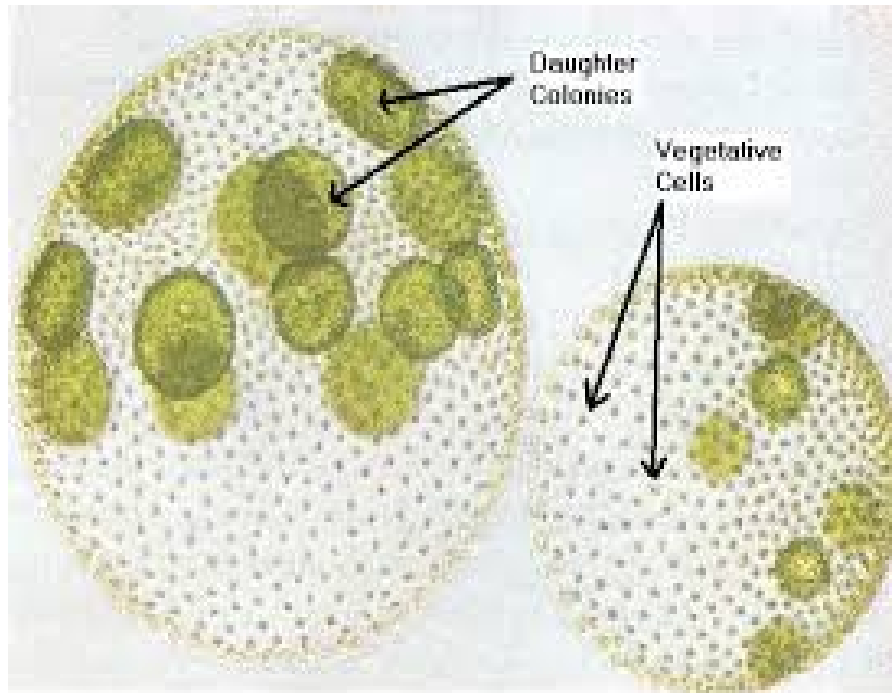
Conjugation in *Spirogyra*



2- Chlorophyta

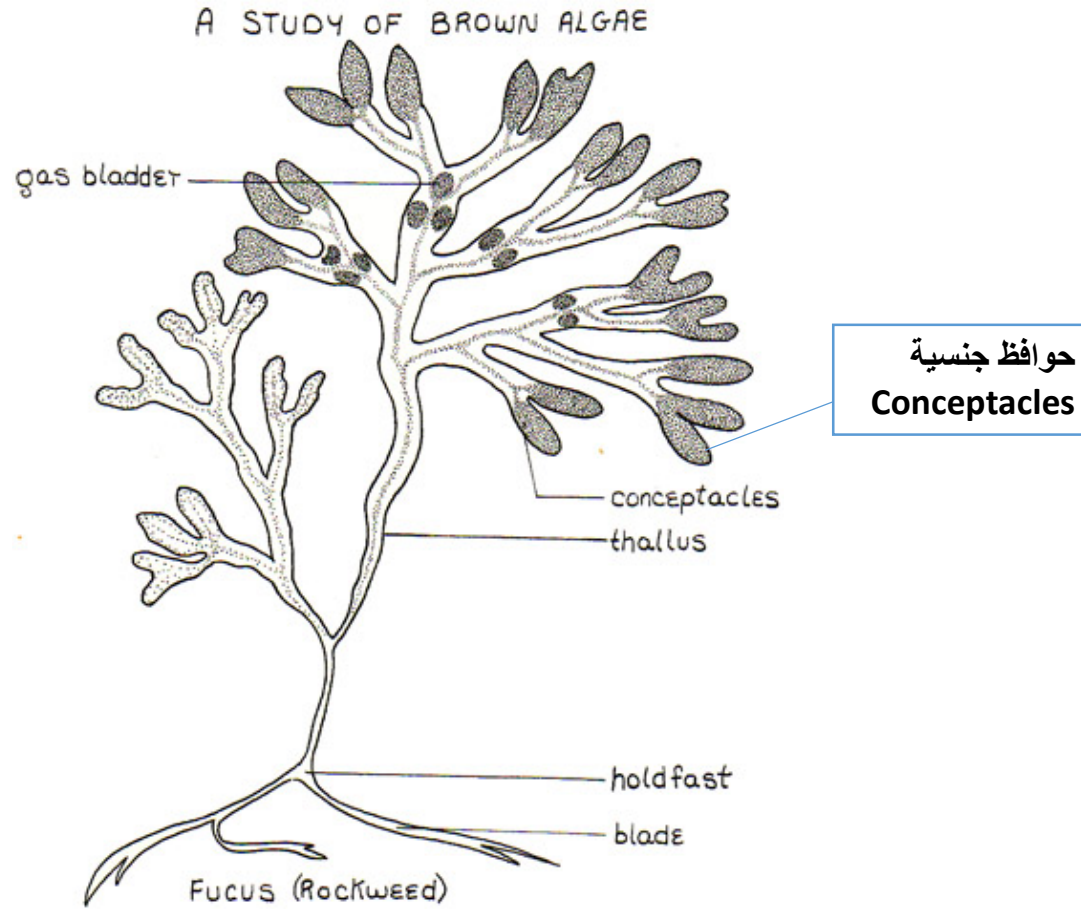
Microscopic graph

مثل : طحلب الفولفكس *Volvox*



3- Phaeophyta

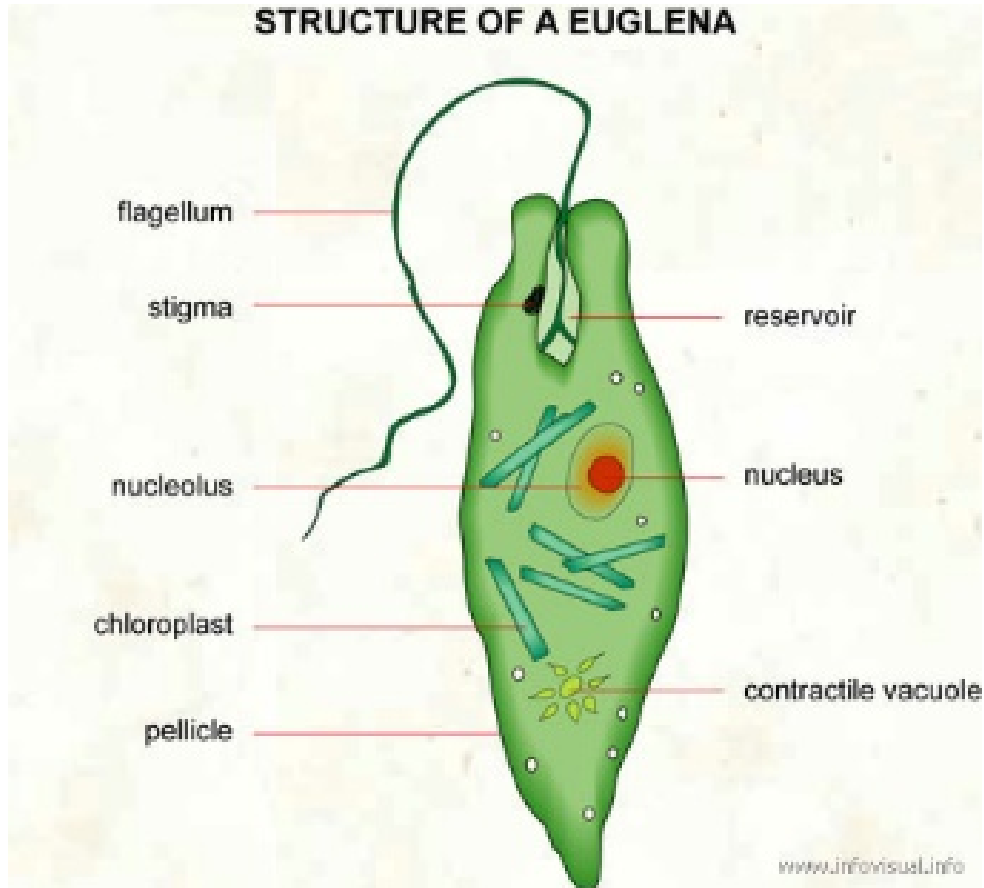
مثل : طحلب *Fucus*



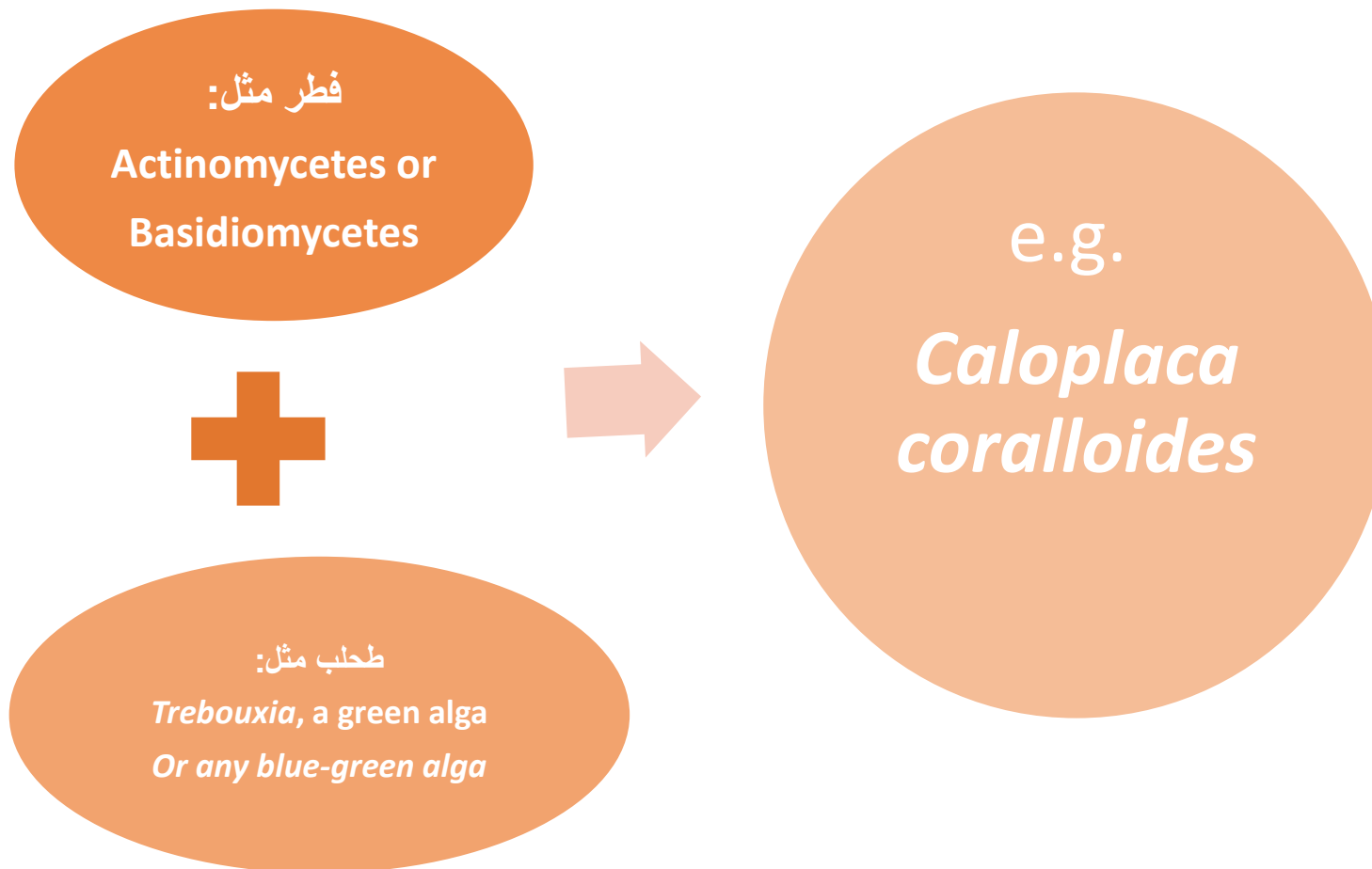
6- Euglenophyta

مثل :

Euglena طحلب



4th : Lichens



Lichen's Morphology

أشنيات
شجيرية

أشنيات ورقية

أشنيات
قشرية

Types of lichens

lichens are composed of an algae and fungus hyphae



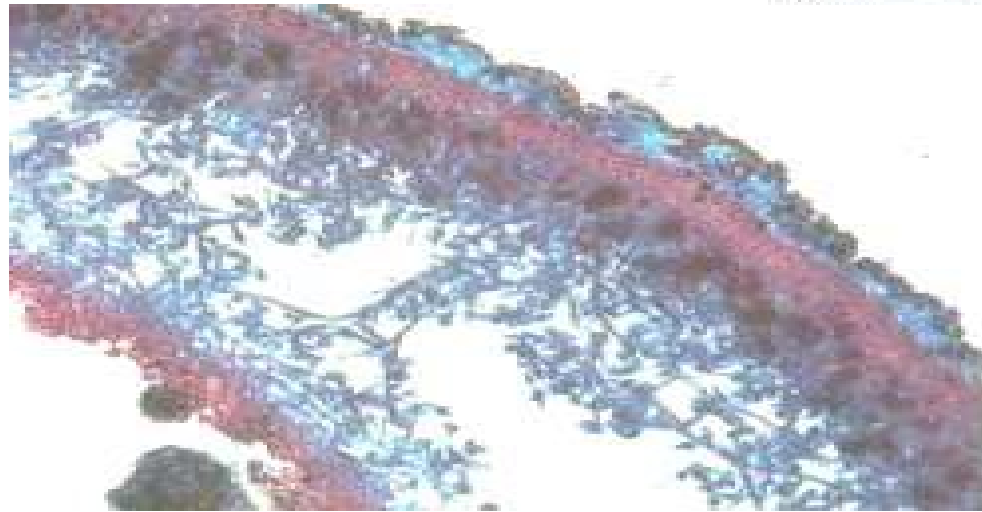
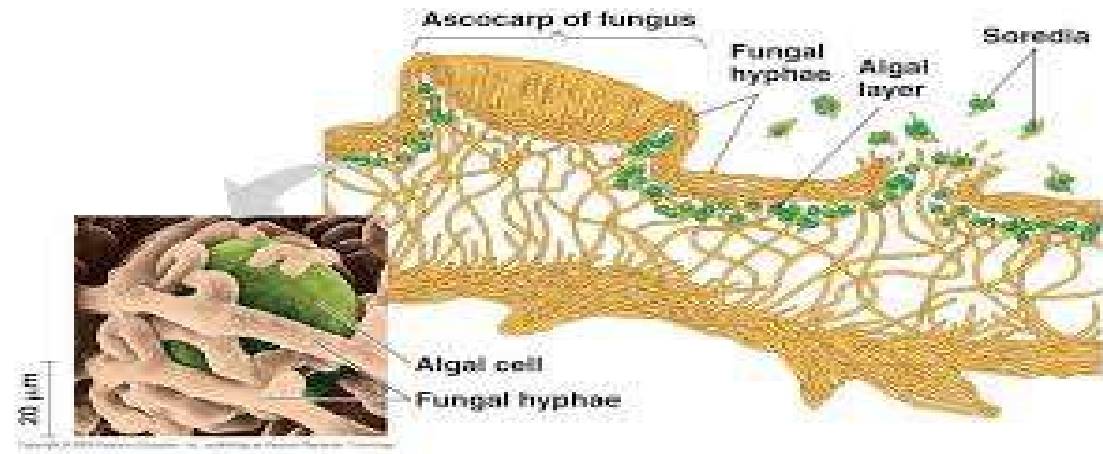
1. Crustose - encrusting



2. Foliose – leaf-like, no branching



3. Fruticose – bush-like
with branching



Any Questions

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Aljawhara Alabbad

