



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)

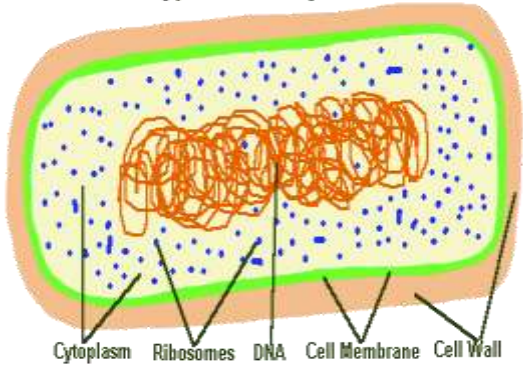
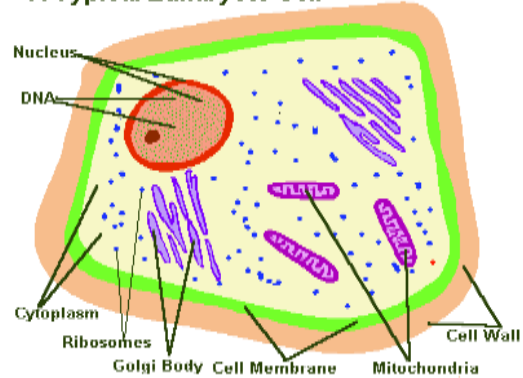
3

Feeding Type (autotroph or heterotroph)

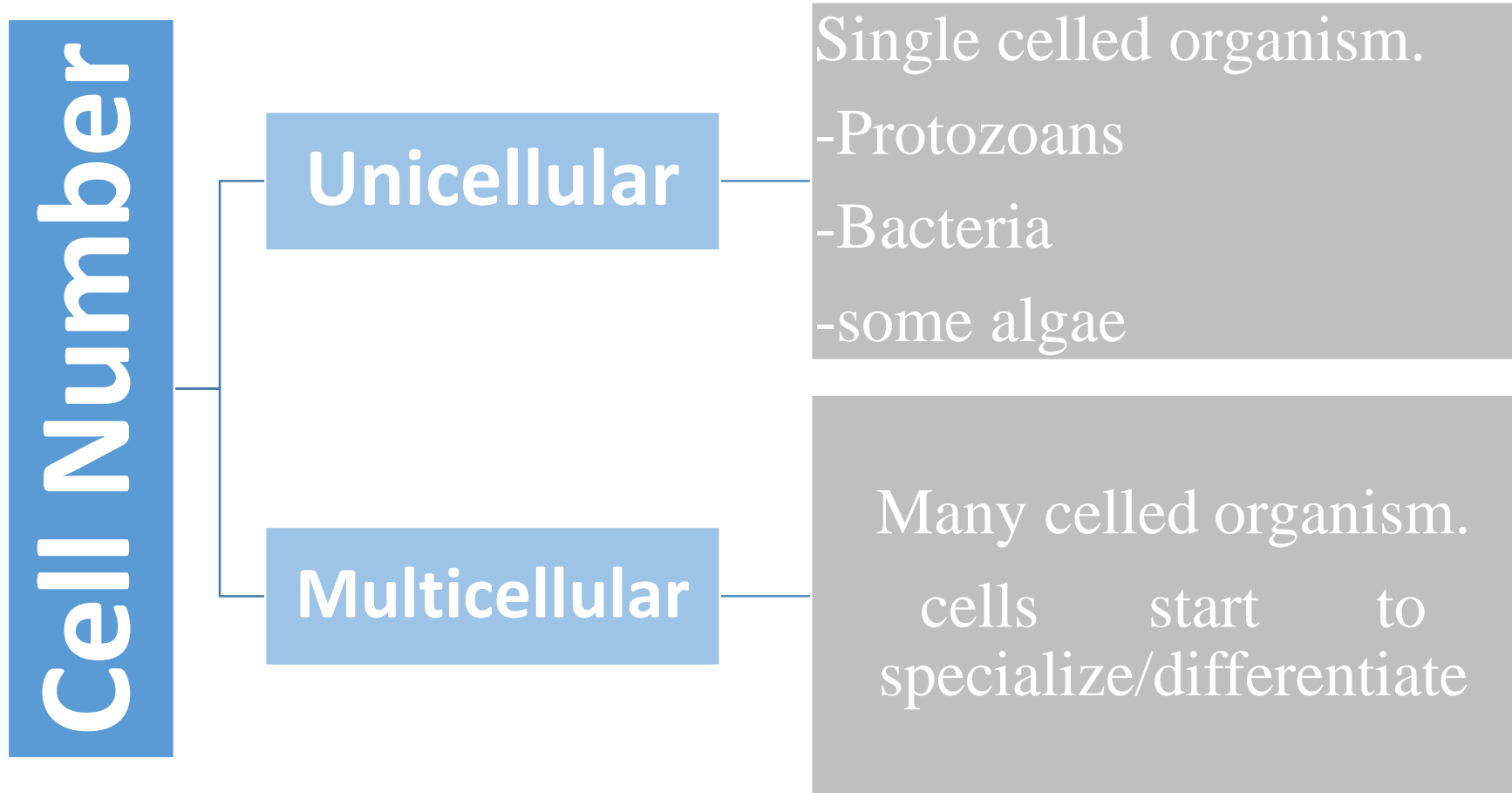
1st : Cell Type

- 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>A Typical Prokaryote Cell</p> 	<p>A Typical Eukaryote Cell</p> 

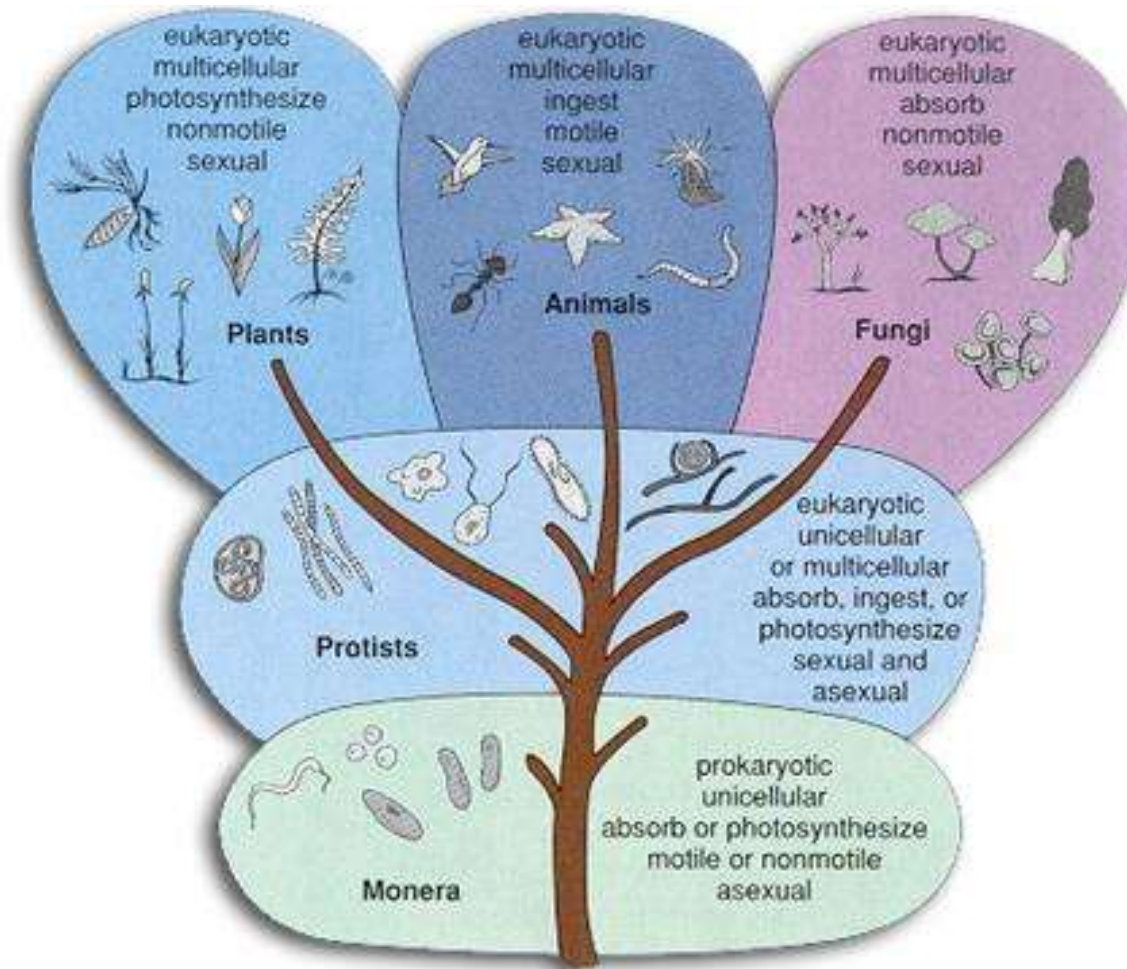
2nd : Cell Number

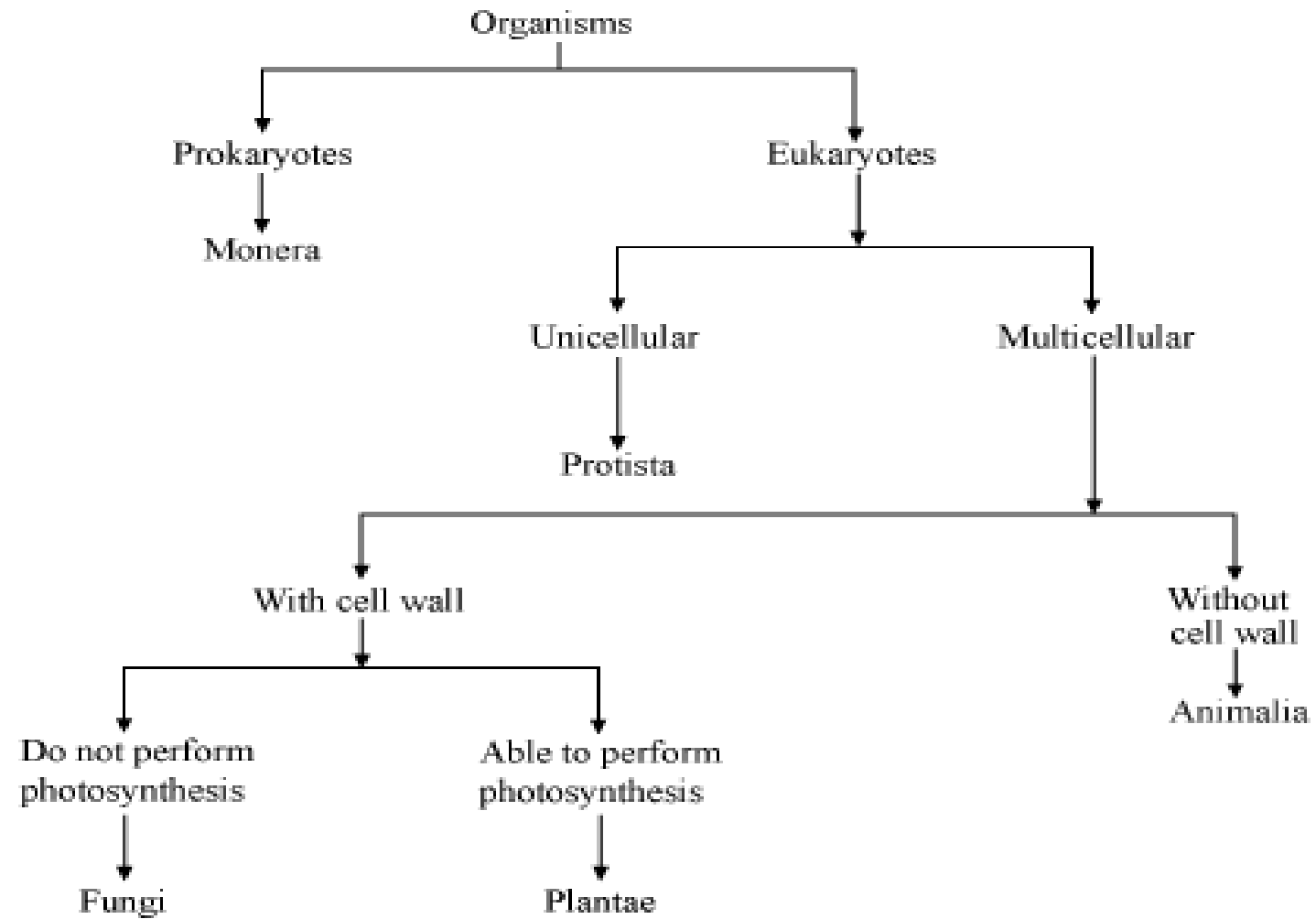


3rd : Feeding Type

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



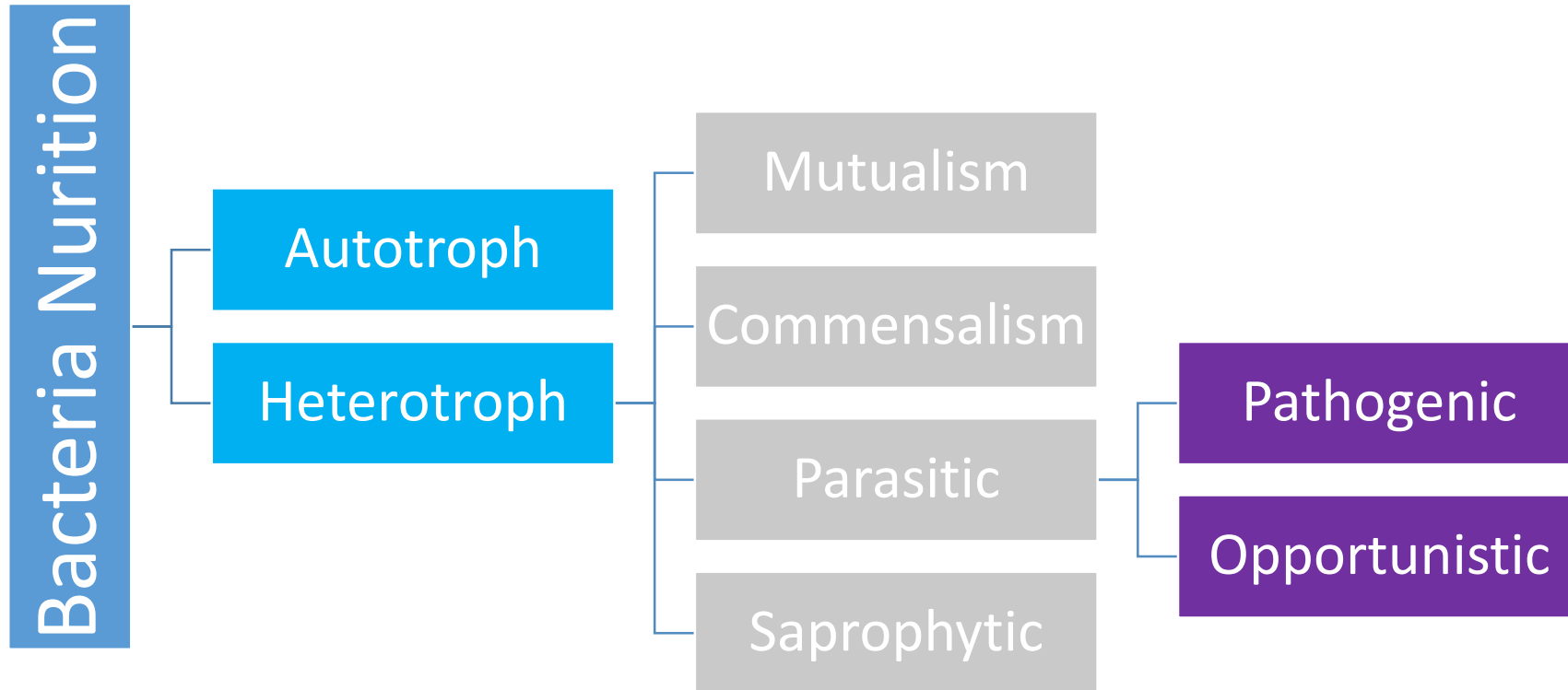
Animalia

Eukaryotes | Multicellular

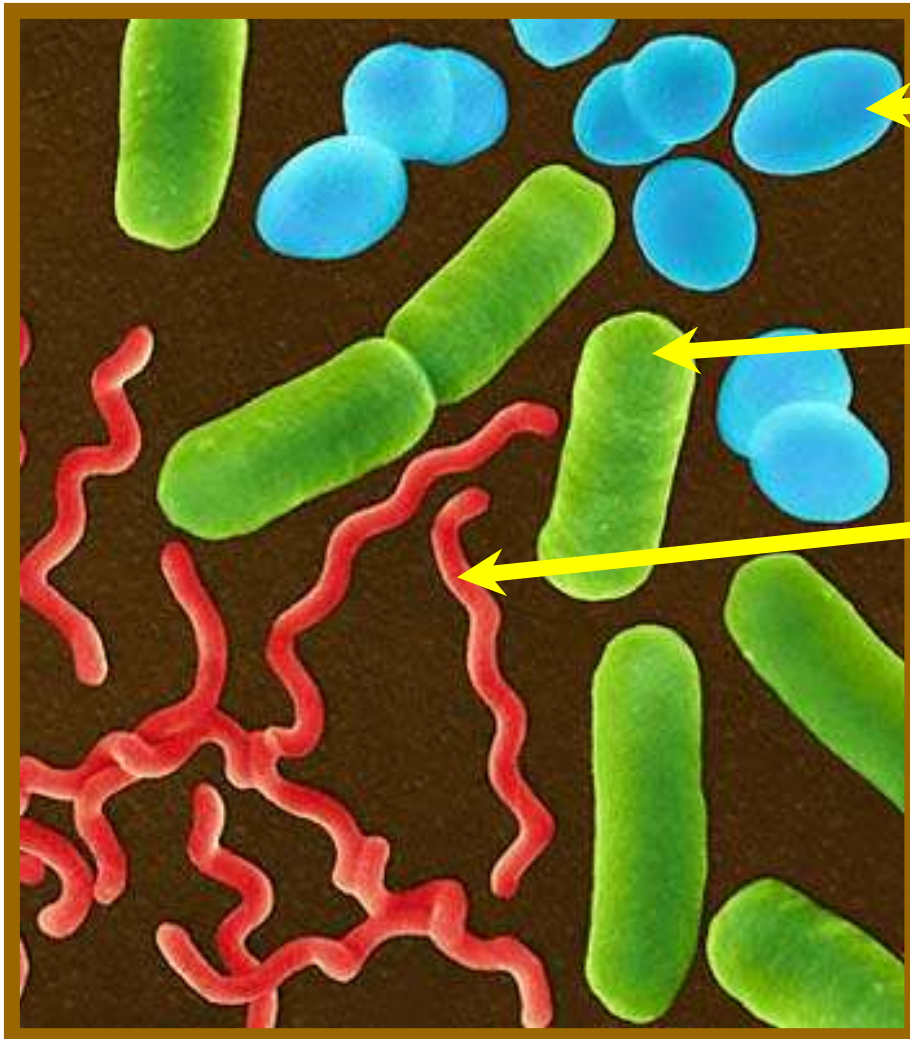
No cell wall



❖ 1st : MoneraKingdome (Bacteria)



Bacterial Morphology



Coccus .1

Bacillus .2

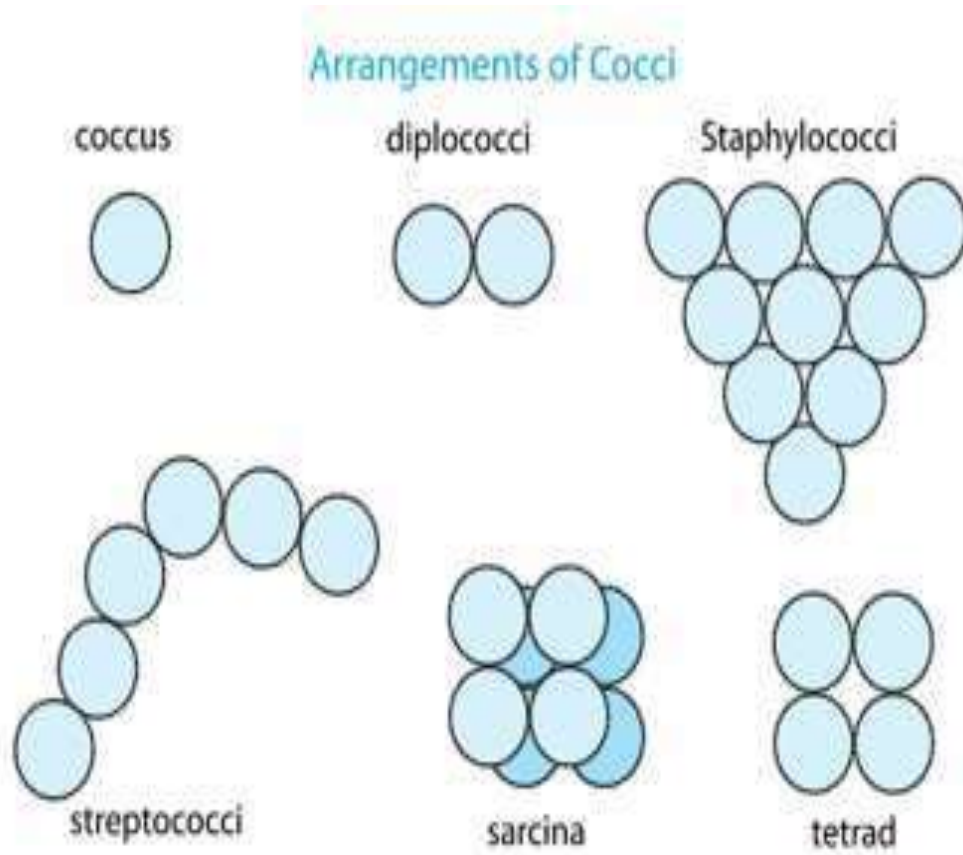
Spirillum .3

Filamentous .4

Aggregation System

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

1. Cocci



For example :

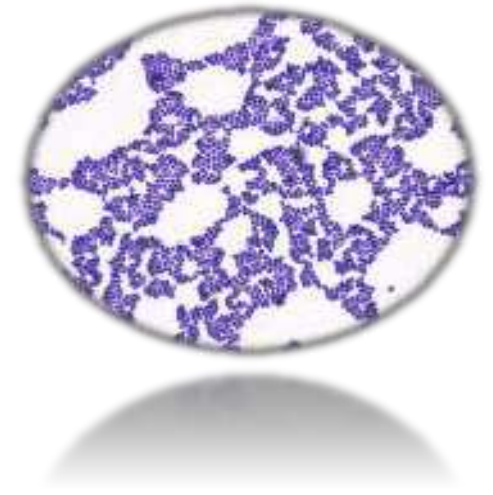
Staphylococcus aureus

Shape : cocci

Arrangement : cluster
(staph)

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

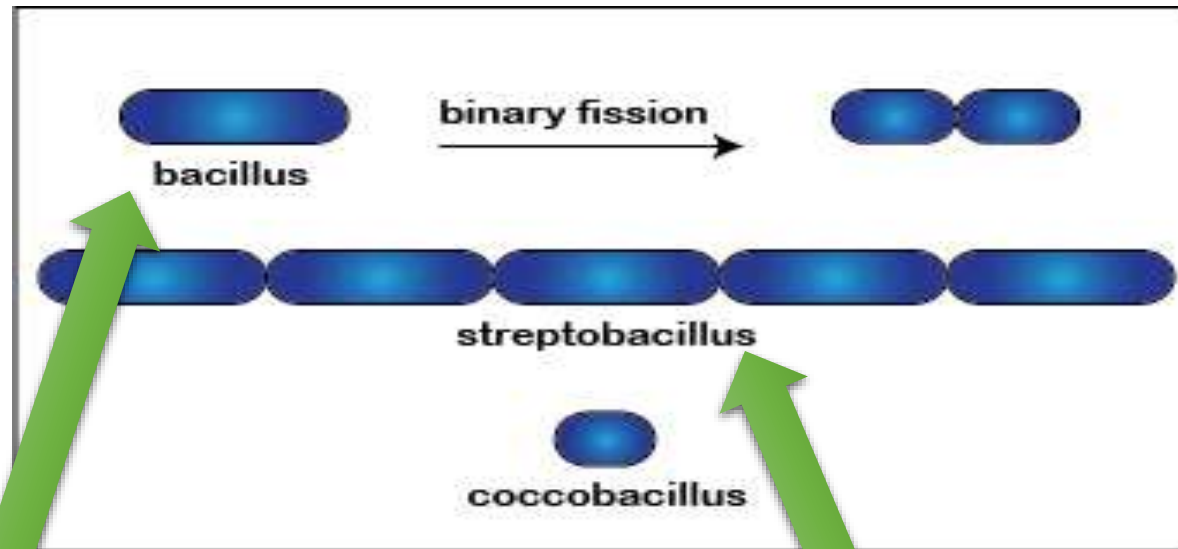
Disease : skin infection.



2- Bacillus

أنظمة التجمع المختلفة لخلايا البكتيريا
العصوية

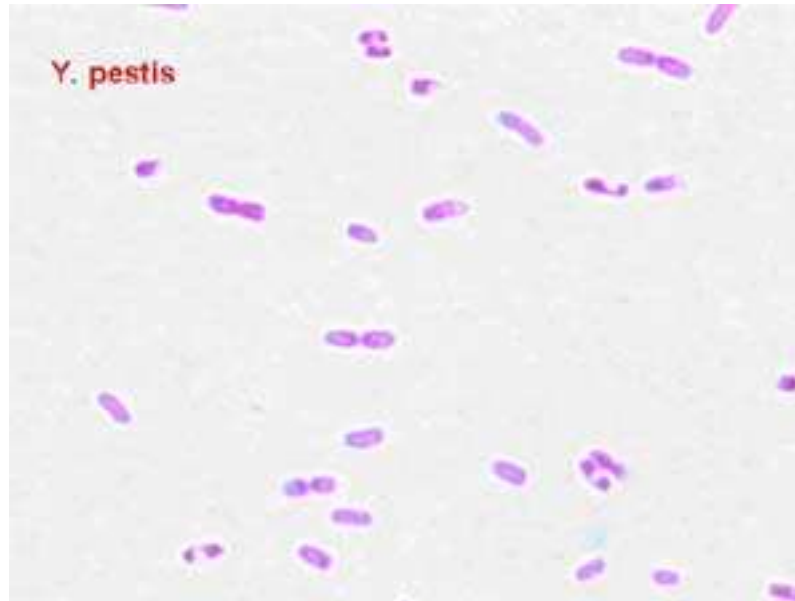
Arrangement of bacilli



مفردة
Mono-

في سلاسل
Strepto-

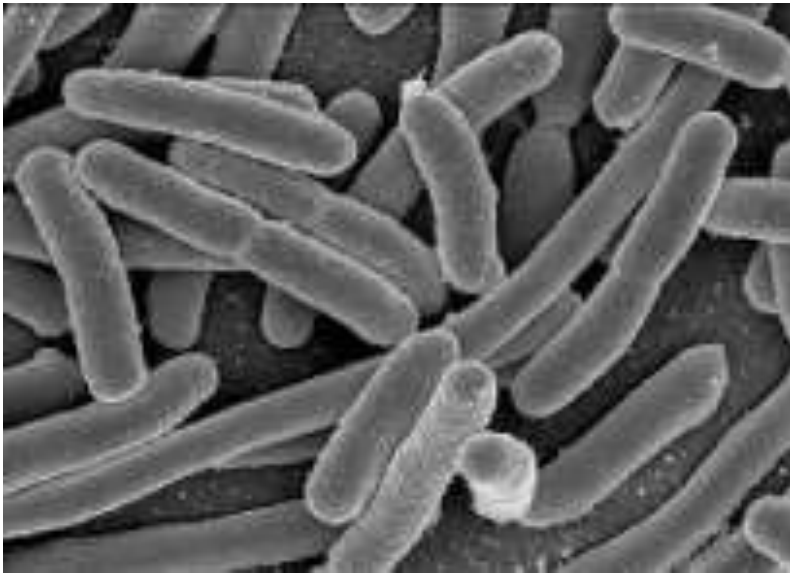
2- Bacillus



مثل البكتيريا المسببة للطاعون
Plaque

Yersinia pestis

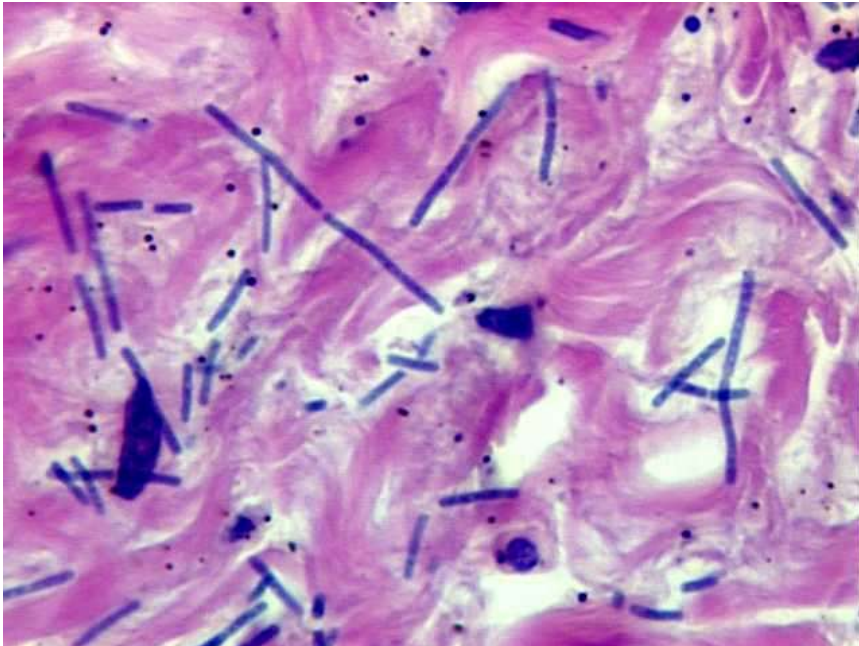
عصيات قصيرة سالبة الجرام



صورة الكتروميكرسكوبيه لبكتيريا عصويه قصيرة
Electromicrograph of Short rods

بكتيريا القولون

Escherichia coli

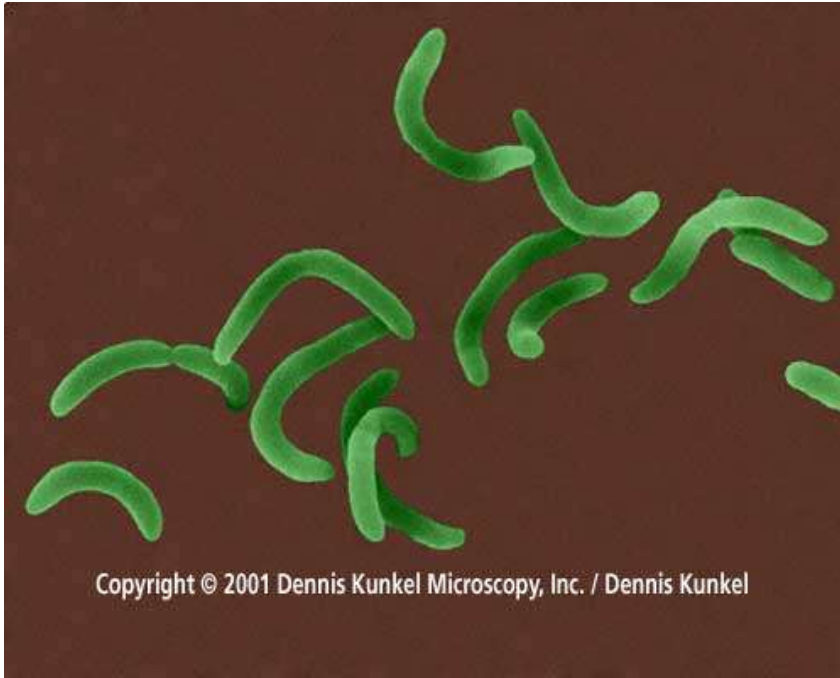


Bacilli Gram-positive bacteria
in chains

البكتيريا المسببة لمرض Anthrax

Bacillus anthracis

3- Spirillum

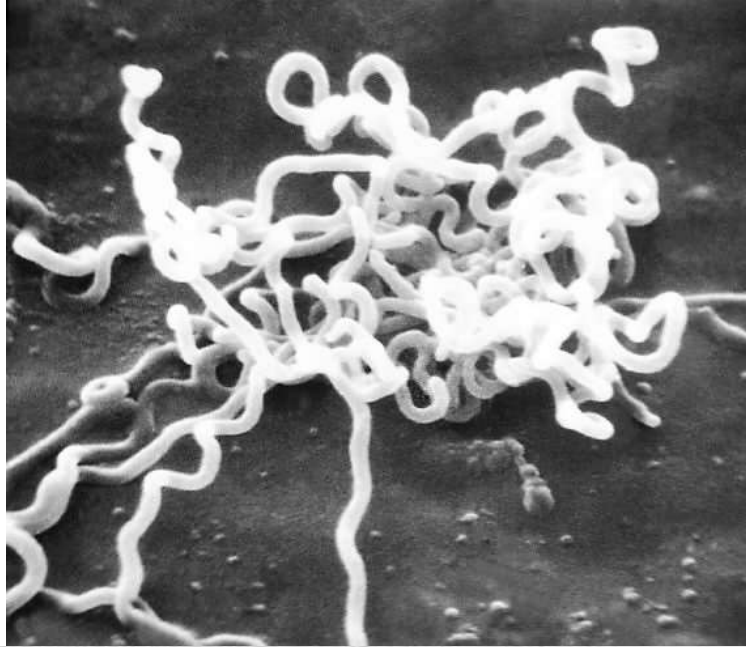


البكتيريا المسببة الكوليرا

Vibrio cholerae



4- Spirochete



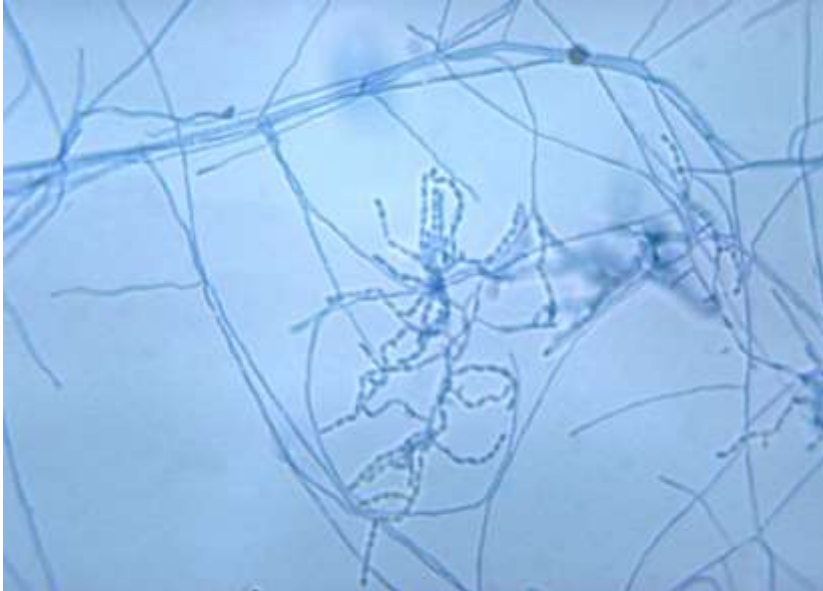
البكتيريا المسببة لمرض الزهري
Syphilis

Treponema pallidum

G-ve bacteria



5- Filamentous (Actinomycetes)

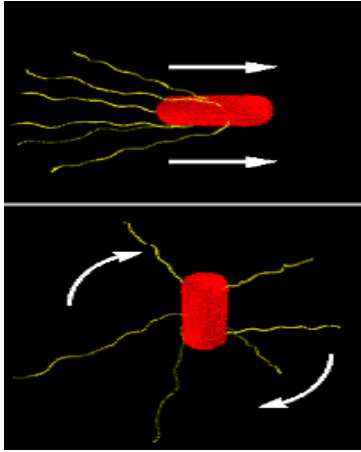


Branched bacilli

e.g. *Nocardia*



Motility of Bacteria

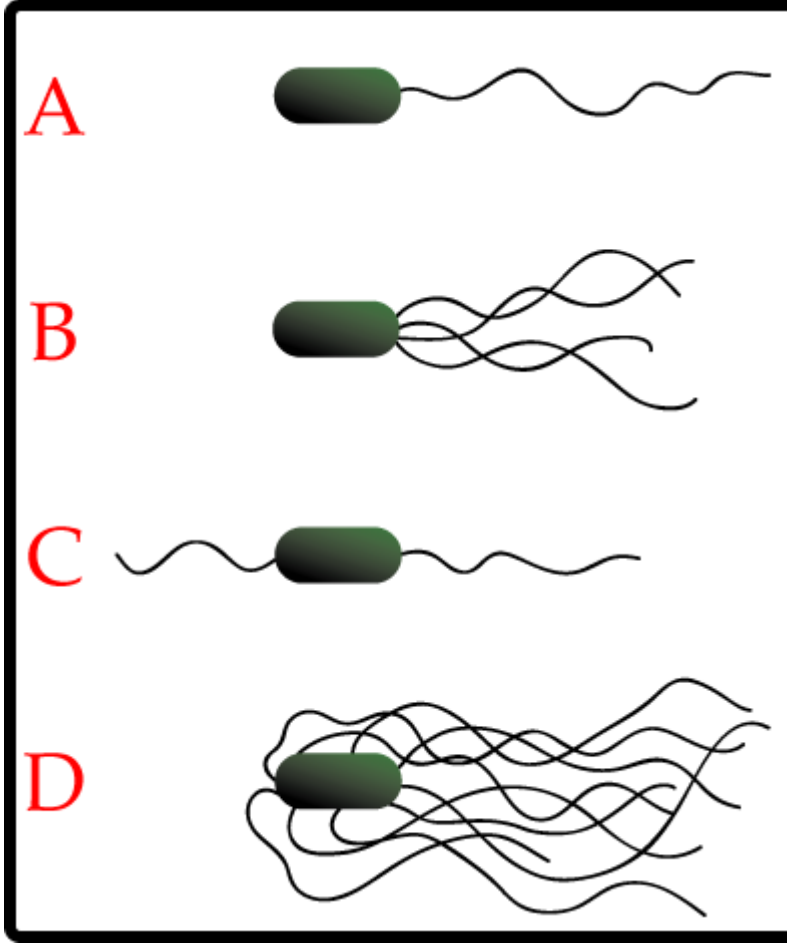


- بكتيريا غير متحركة:
مثل معظم البكتيريا الكرويه

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



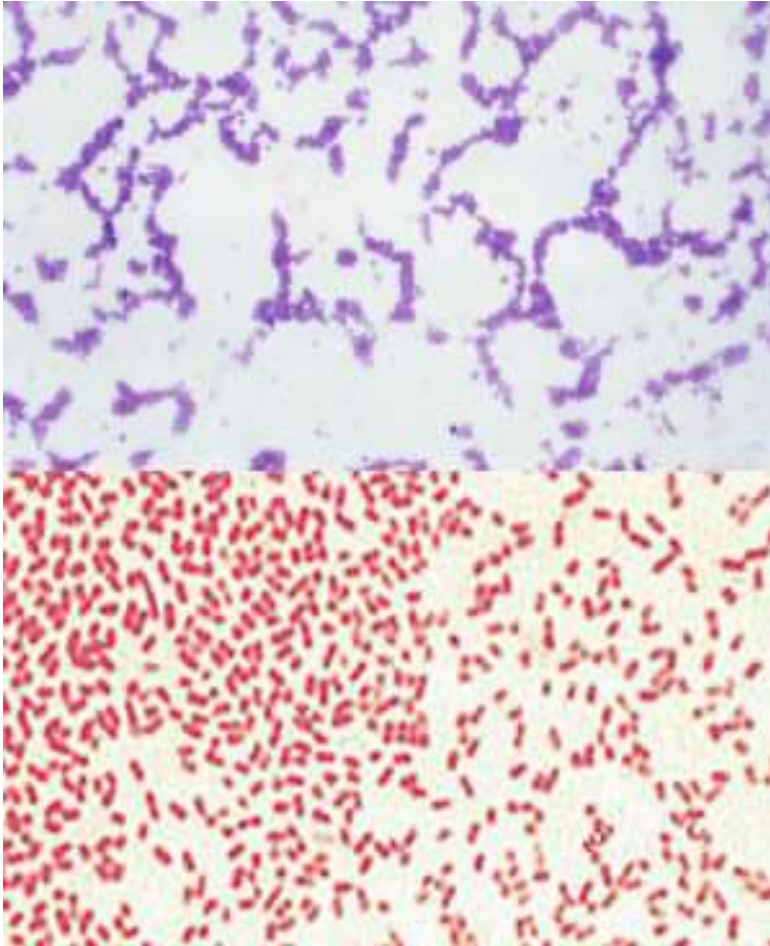
- الانزلاق Gliding
- (مثل *Myxobacteria*)



- 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

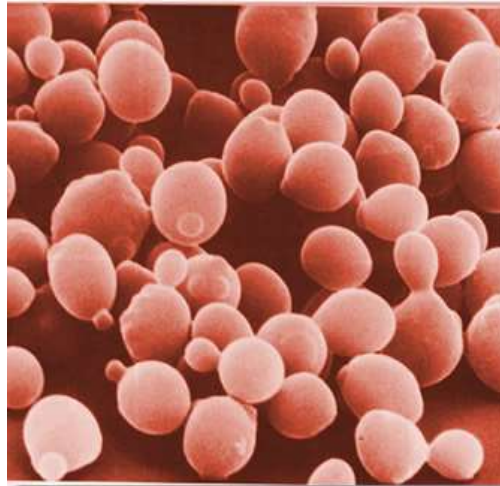
مثل: *E. coli*

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- Zygospor (الزيجية) :

Zygomycetes e.g. *Rhizopus* sp.

2- Ascomycetes (الأسكية) :

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

، *Saccharomyces cerevisiae*

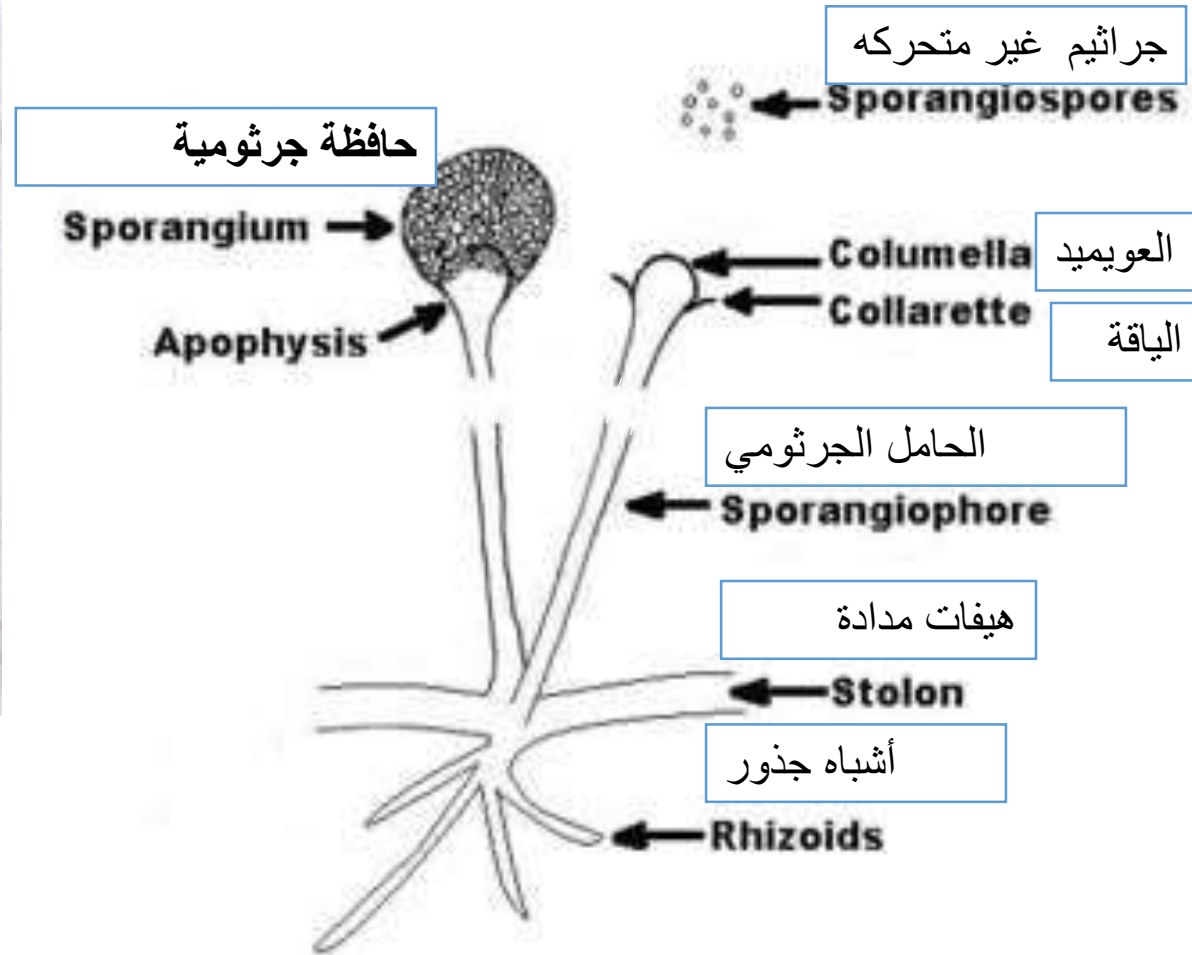
3- Basidiomycete (البازيدية) :

e.g. *Agaricus*

4- Deuteromycetes (الناقصة) :

e.g. *Fusarium*

فطر *Rhizopus*



فطر *Aspergillus*

Chains of Conidia

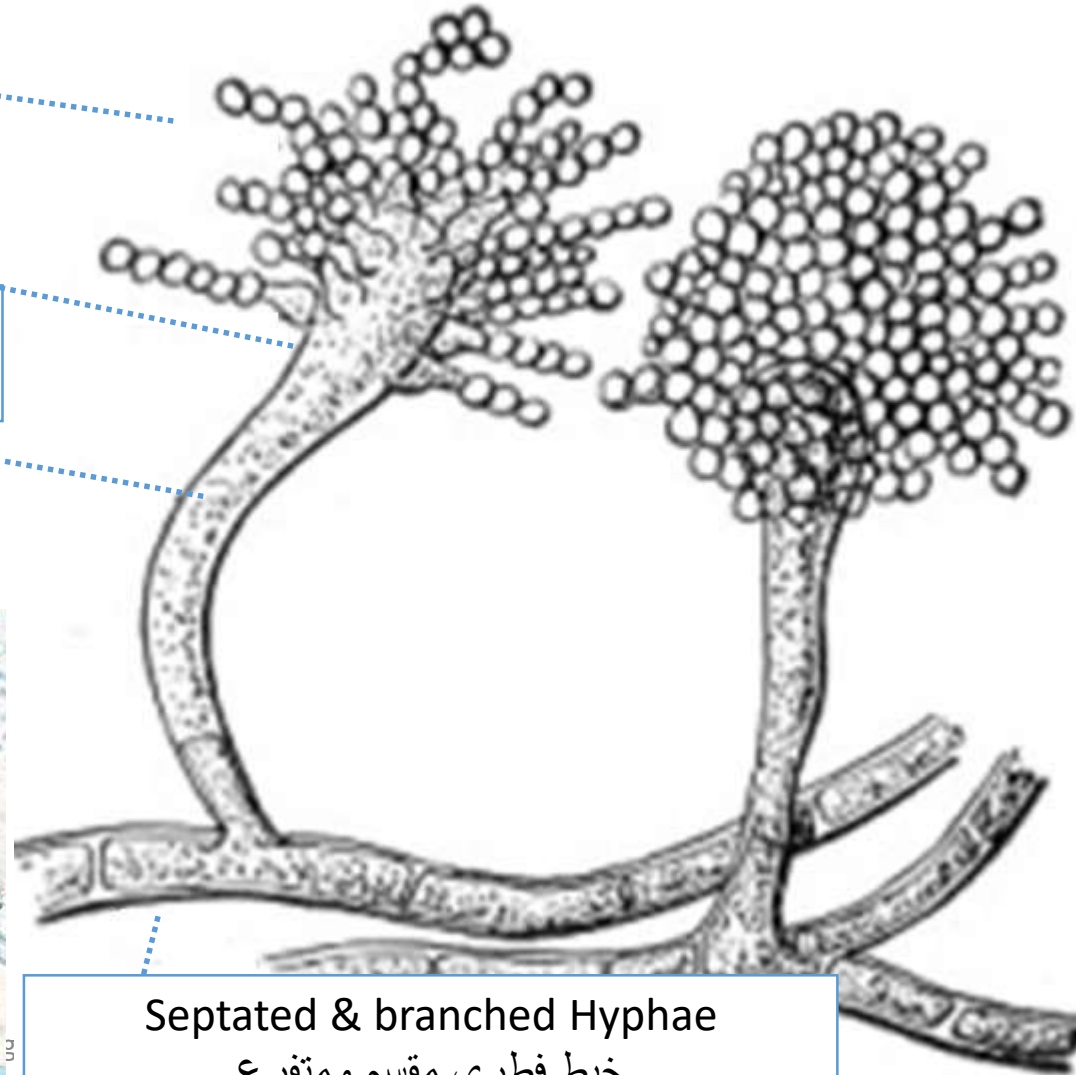
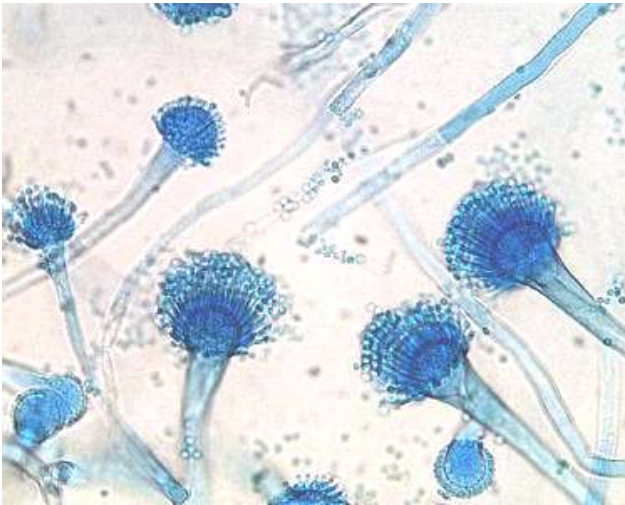
سلاسل من الجراثيم
الكونيدية

Vesicle

الحويصلة

Conidiophore

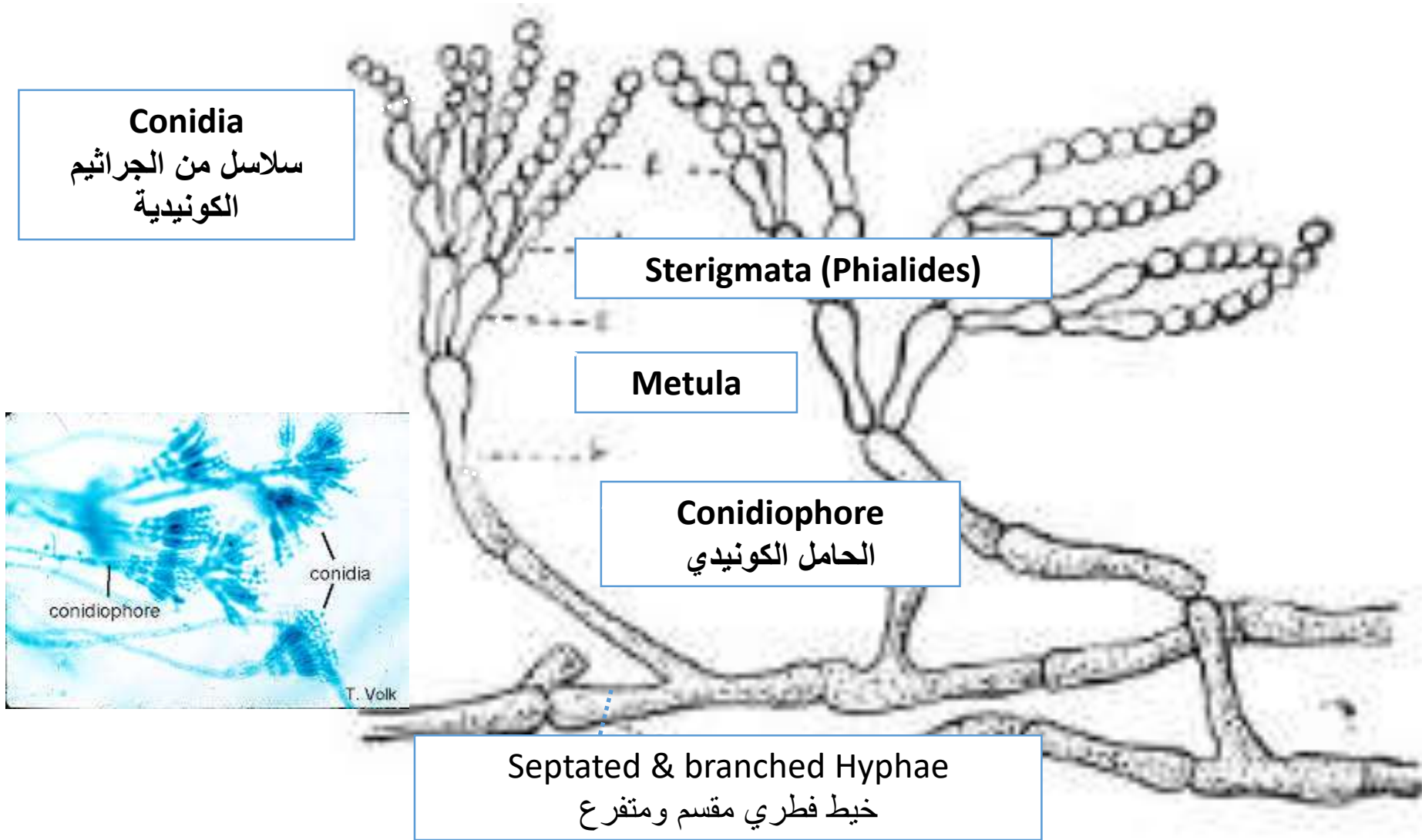
الحامل الكونيدي



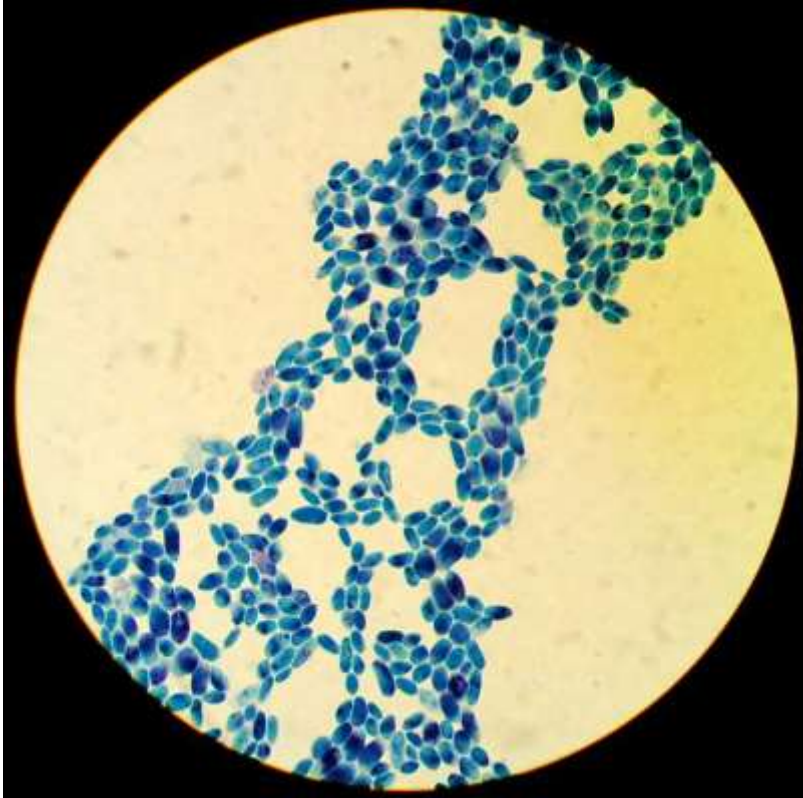
Septated & branched Hyphae

خيوط فطرية مقسمة ومتفرعة

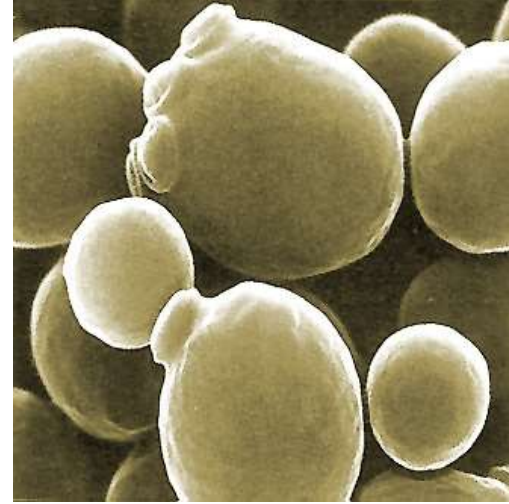
فطر *Penicillium*



فطر *Saccharomyces*

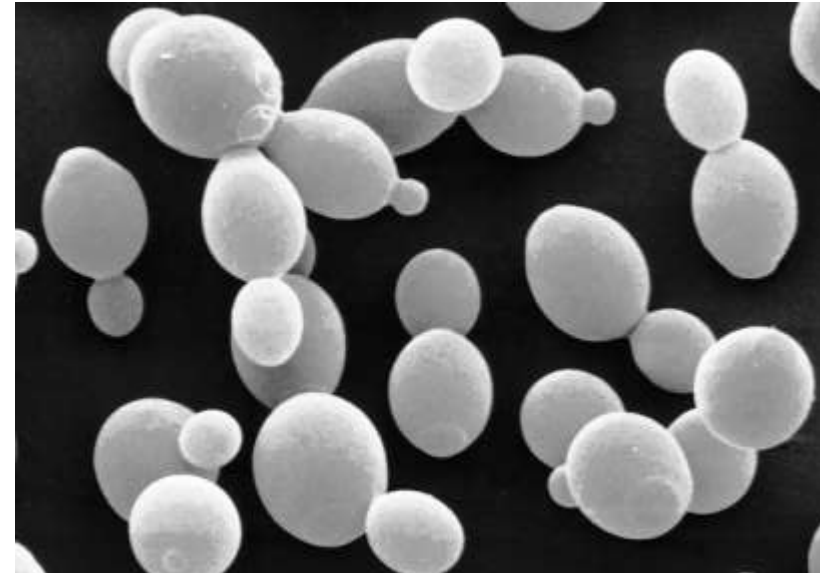
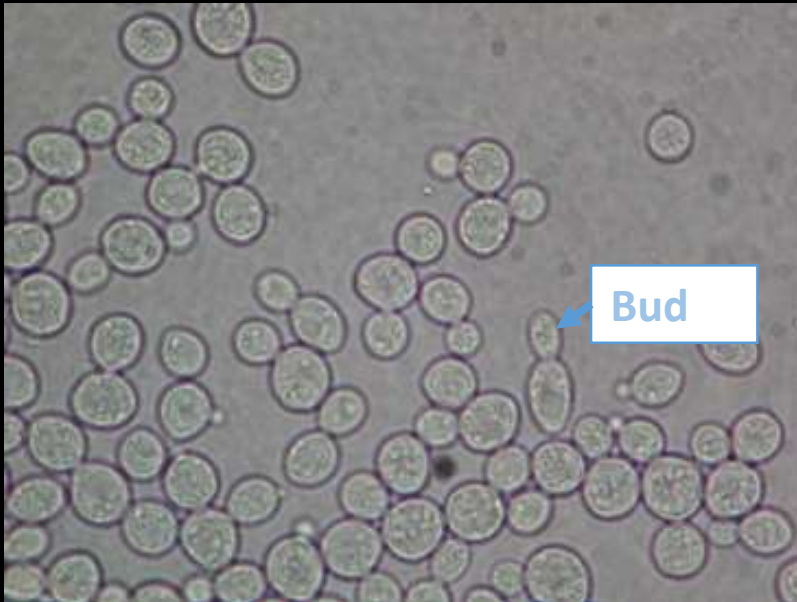


Amal Alghamdi

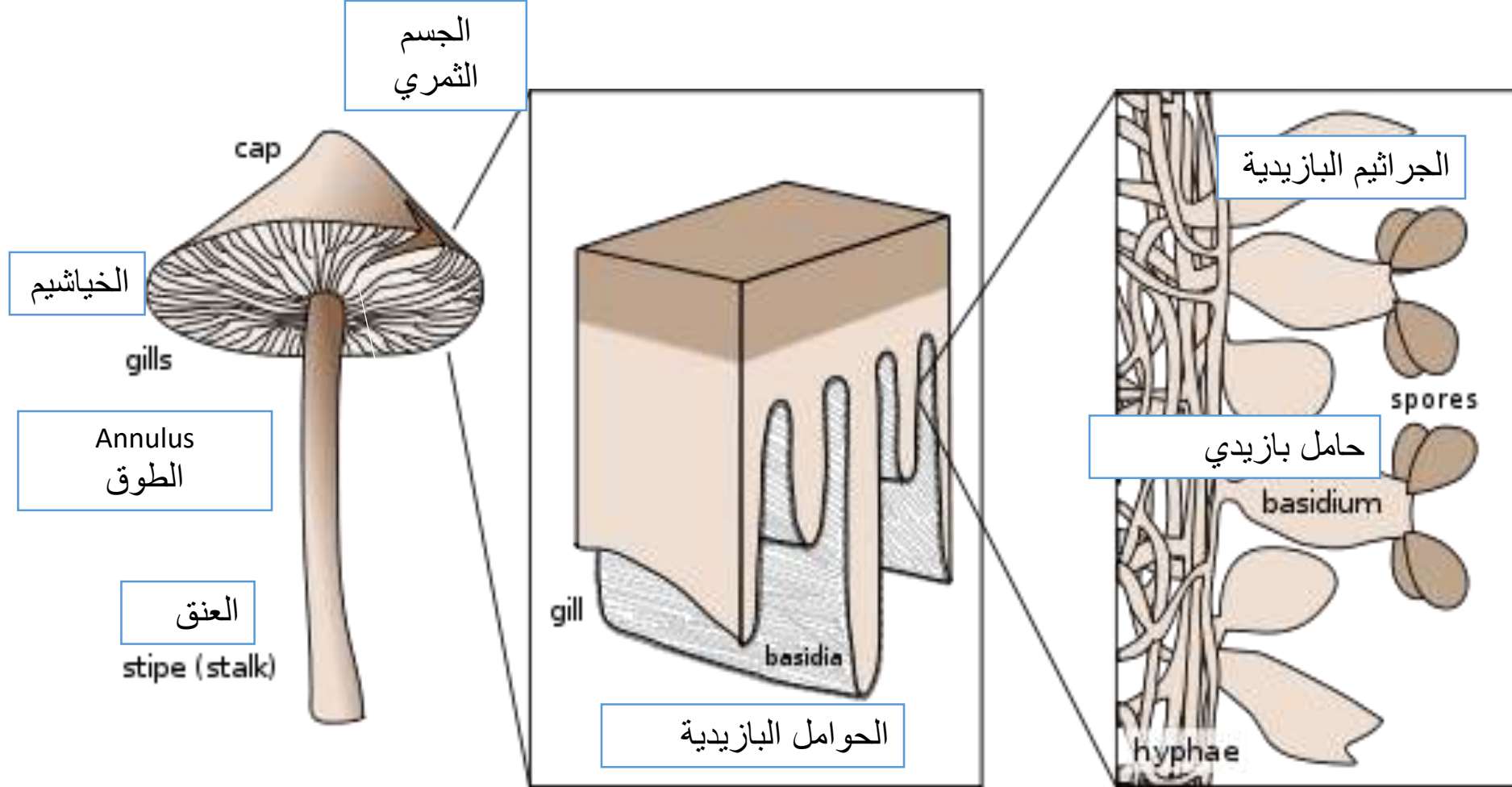


Saccharomyces فطر

**Asexual reproduction:
By Budding**



فطر Agaricus



3rd: Algae

Thallus

```
graph TD; A[Thallus] --> B[Contains Chlorophyll and other pigments]; B --> C[Autotrophs];
```

The diagram is a vertical flowchart with three main text boxes. The first box is dark red and contains the word 'Thallus'. Below it is a light orange bar. A dark red arrow points down to the second box, which is dark brown and contains the text 'Contains Chlorophyll and other pigments'. Below this is another light orange bar. A dark brown arrow points down to the third box, which is grey and contains the word 'Autotrophs'. Below this is a light grey bar.

Contains Chlorophyll and other pigments

Autotrophs

Where can Algae live?

e.g. Nostoc

- In soil

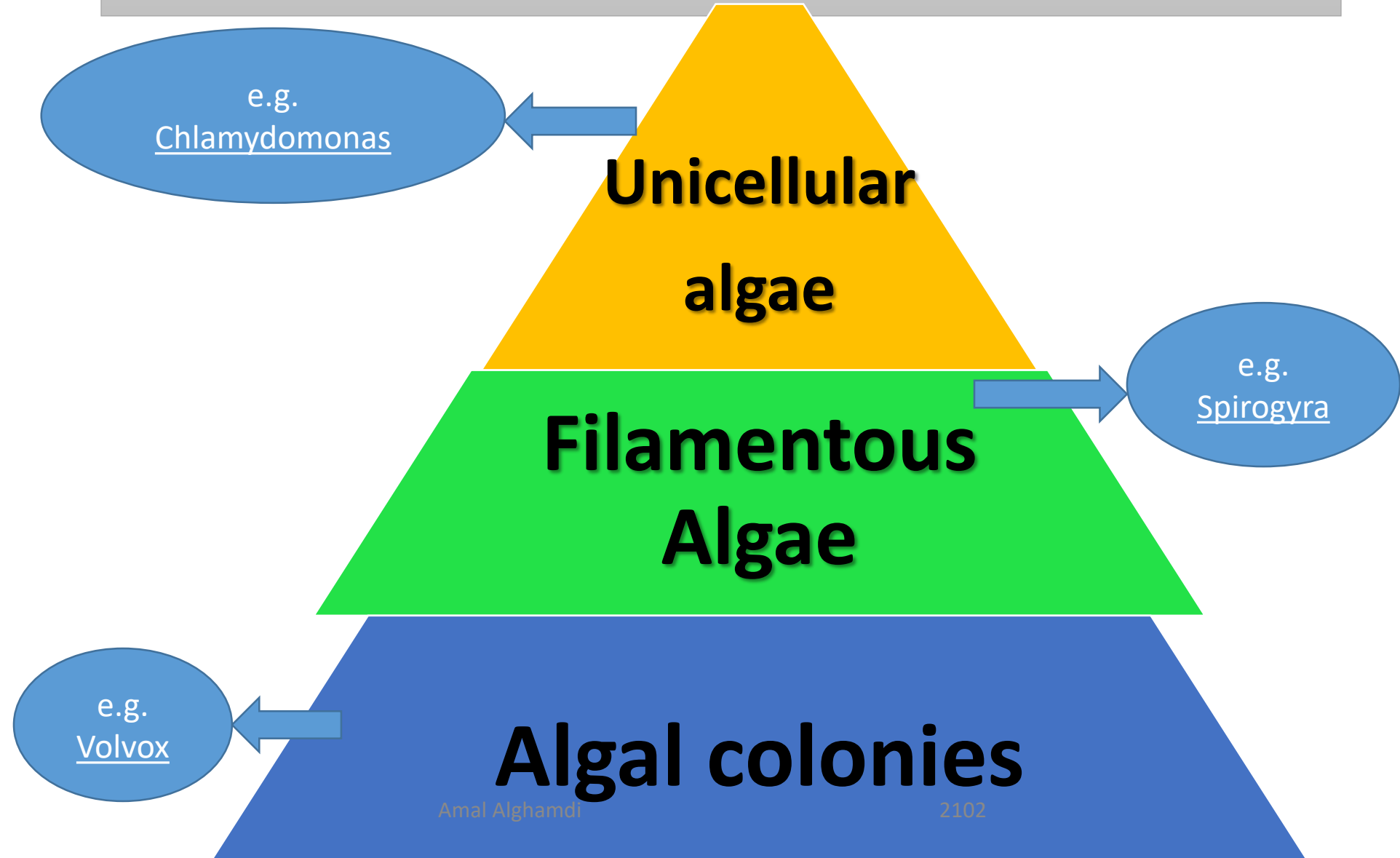
e.g. Diatoms

- In sea water

e.g. Volvox

- In fresh water

Structure

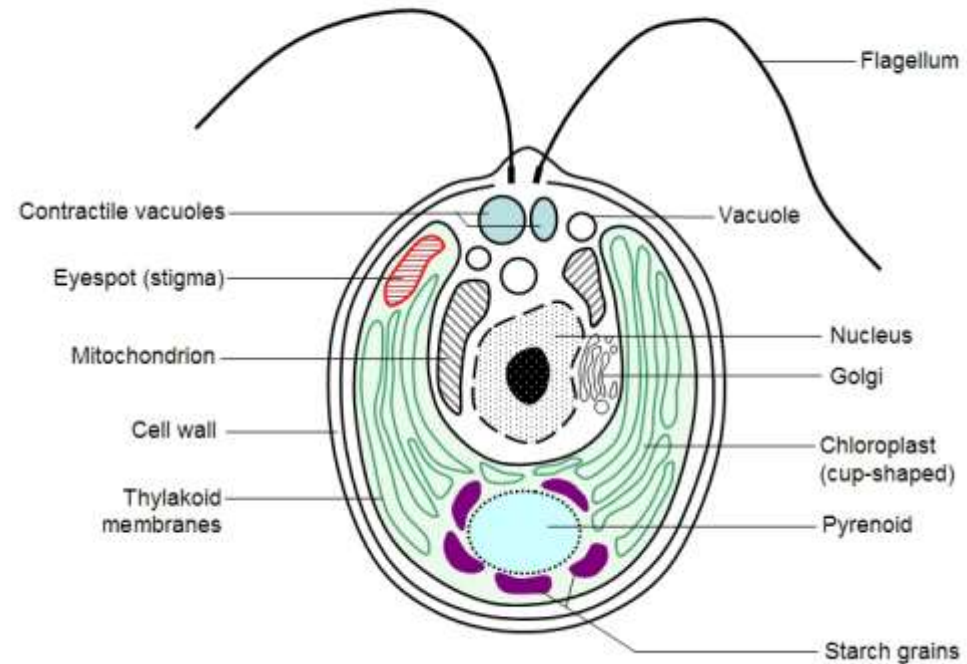


Example of unicellular motile alge



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*

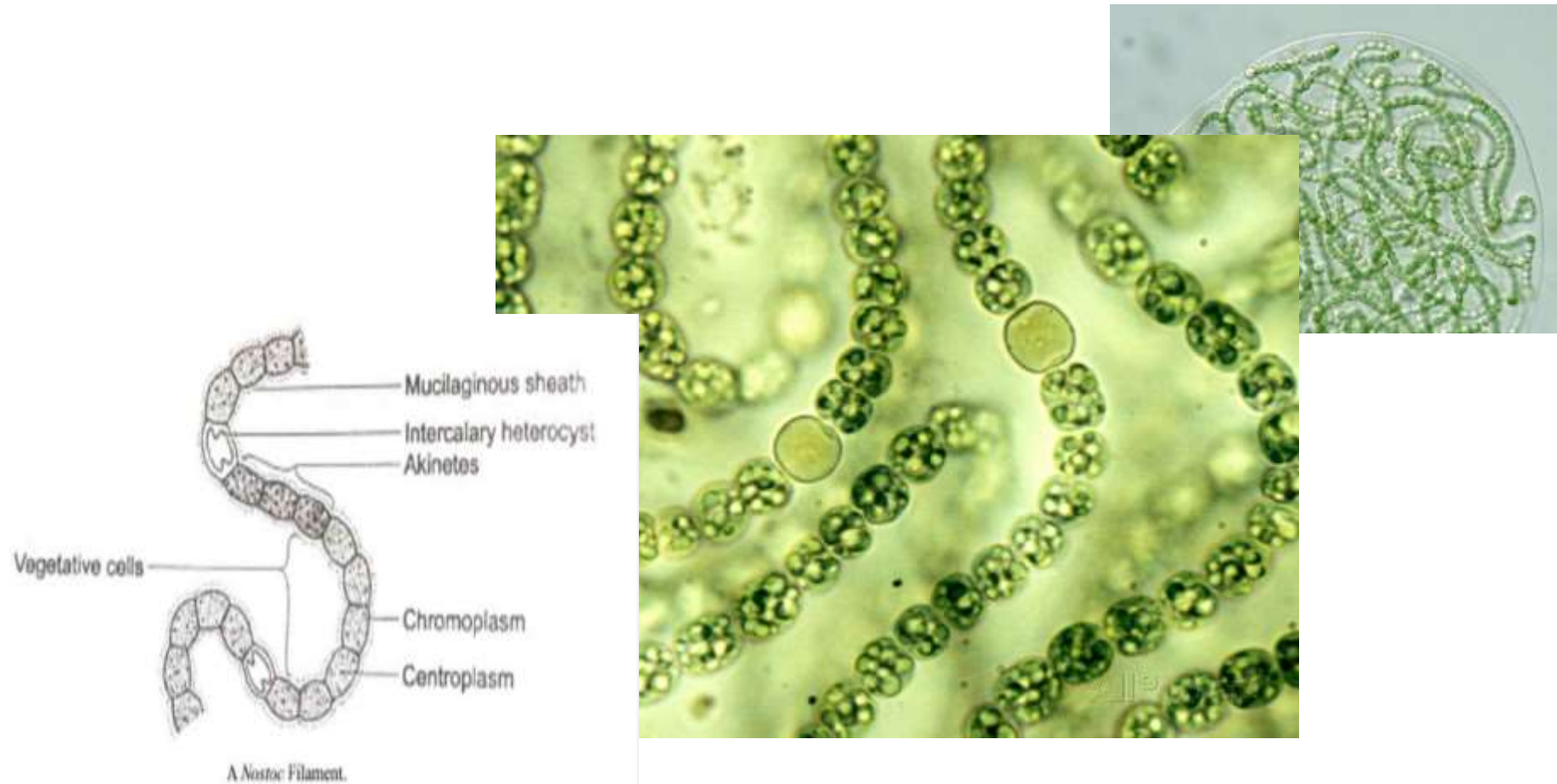
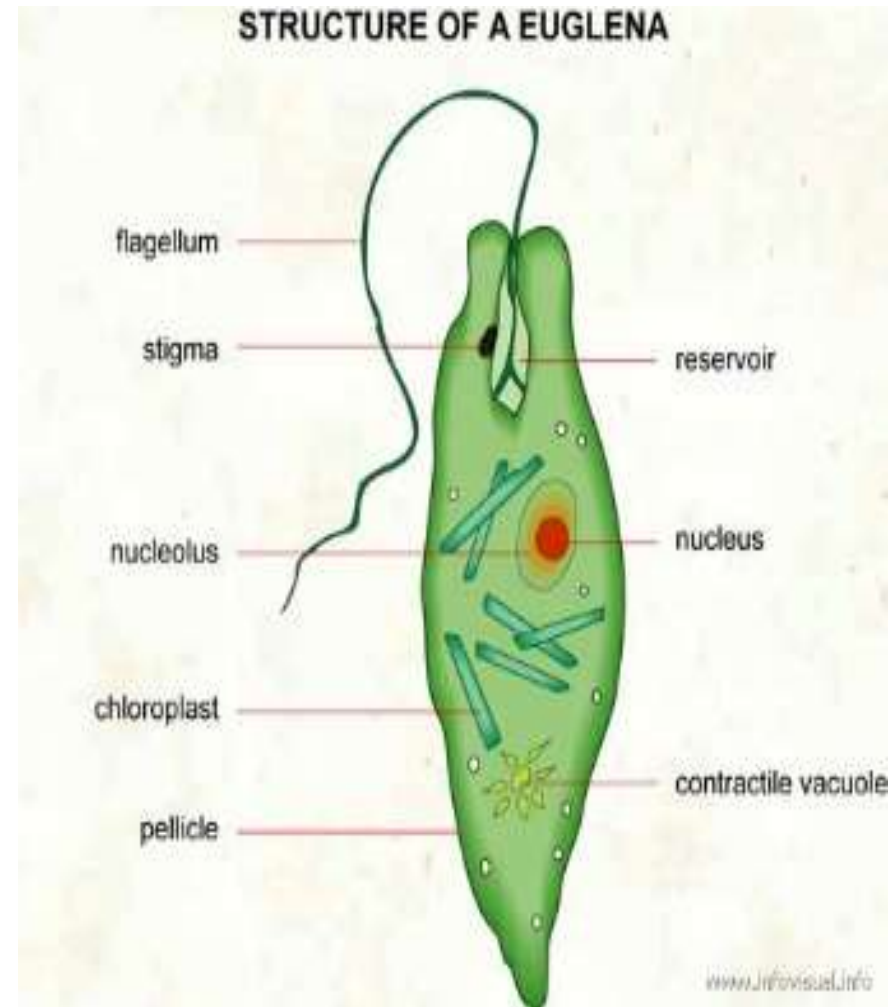


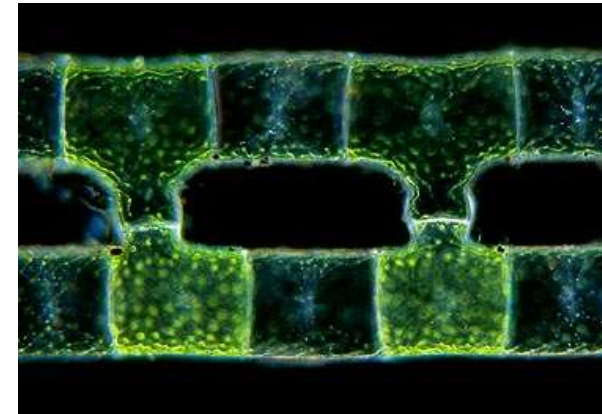
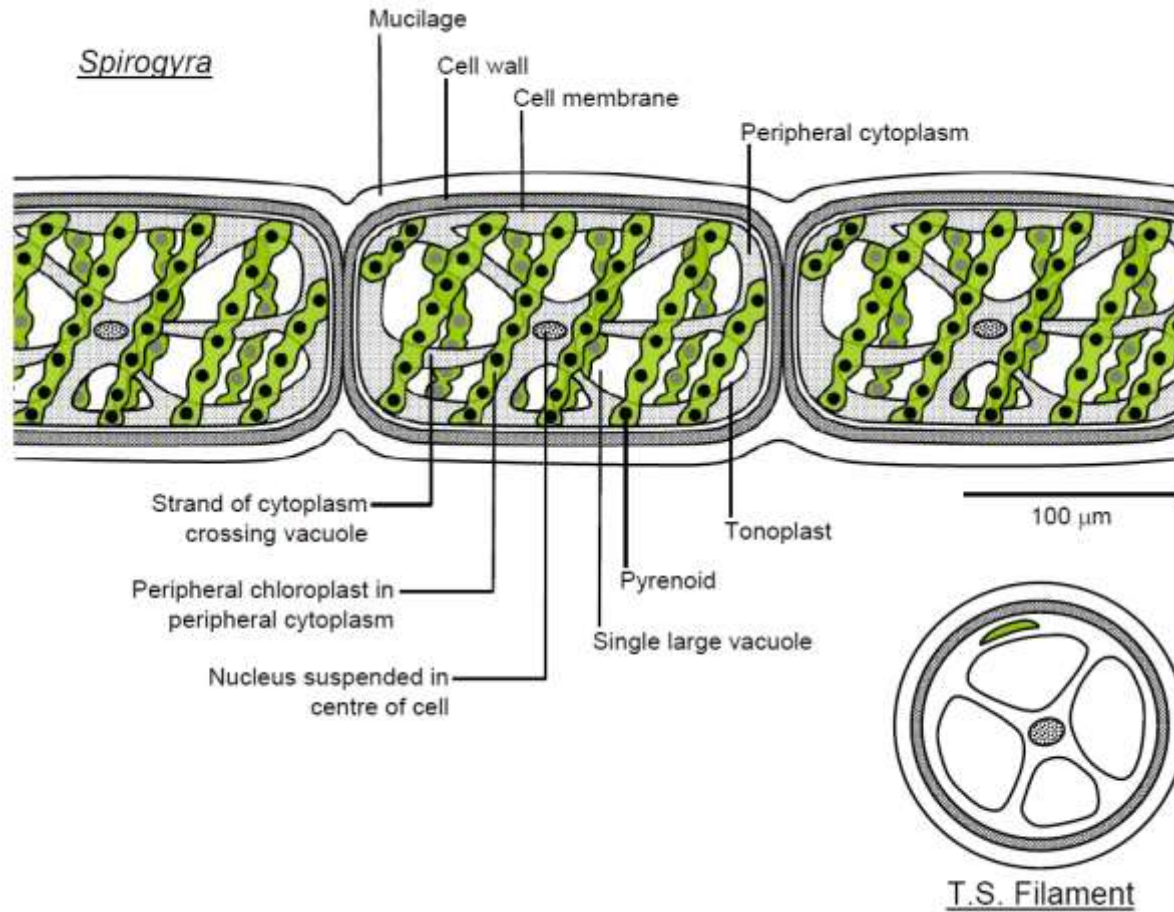
fig: nostoc filament

2- Cholorophyta

مثل: طحلب *Euglena*



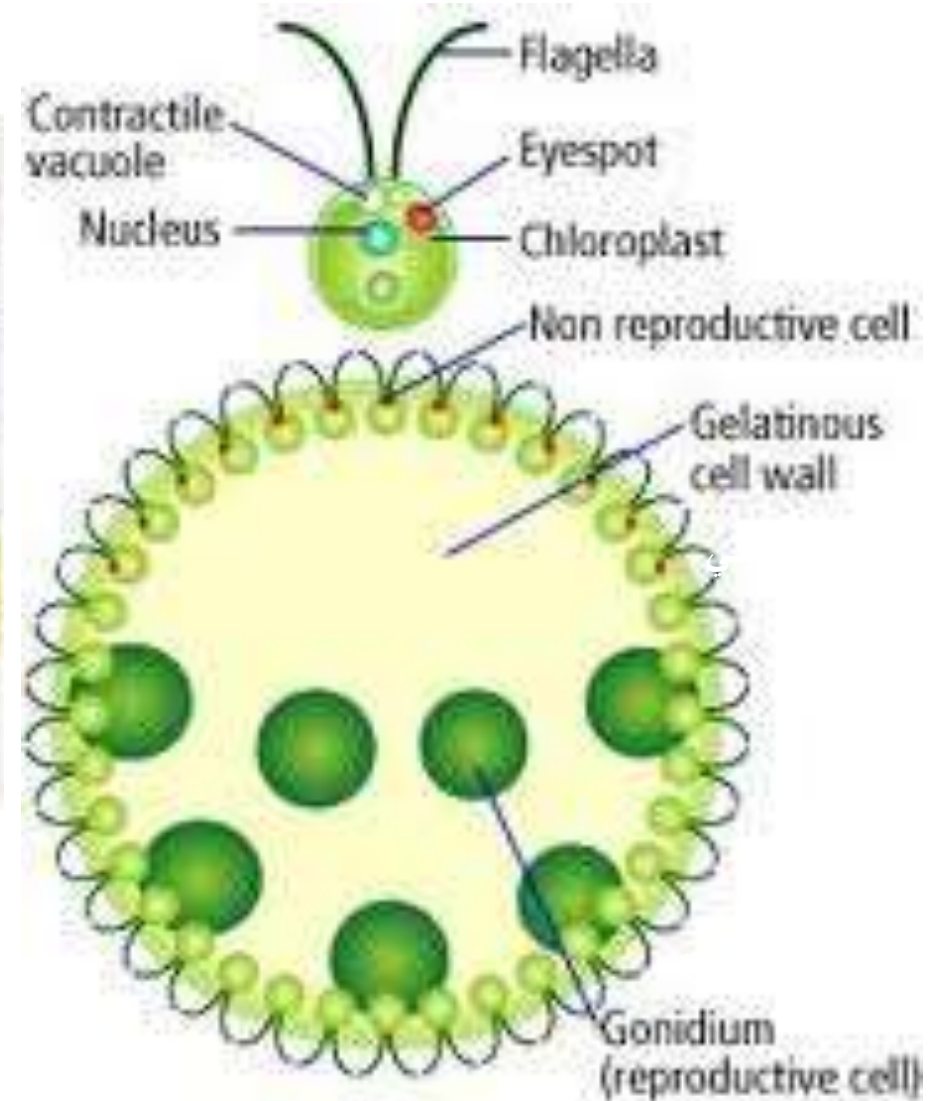
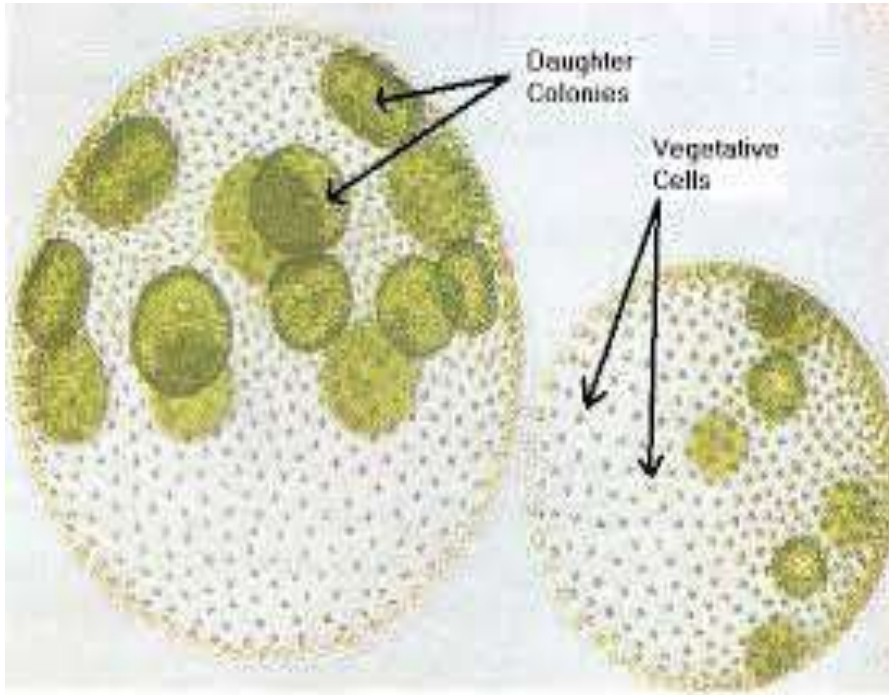
Conjugation in *Spirogyra*



2- Cholorophyta

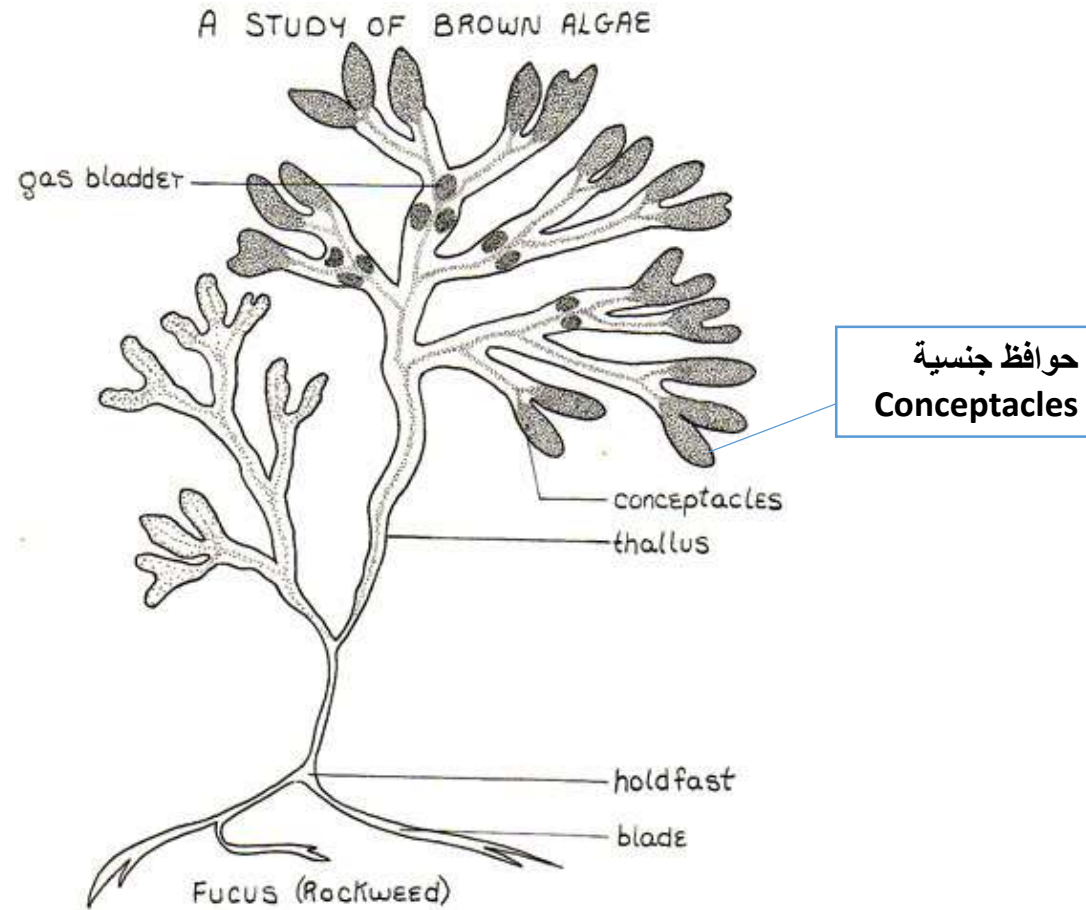
Microscopic graph

مثل : طحلب الفولفكس *Volvox*



3- Phaeophyta

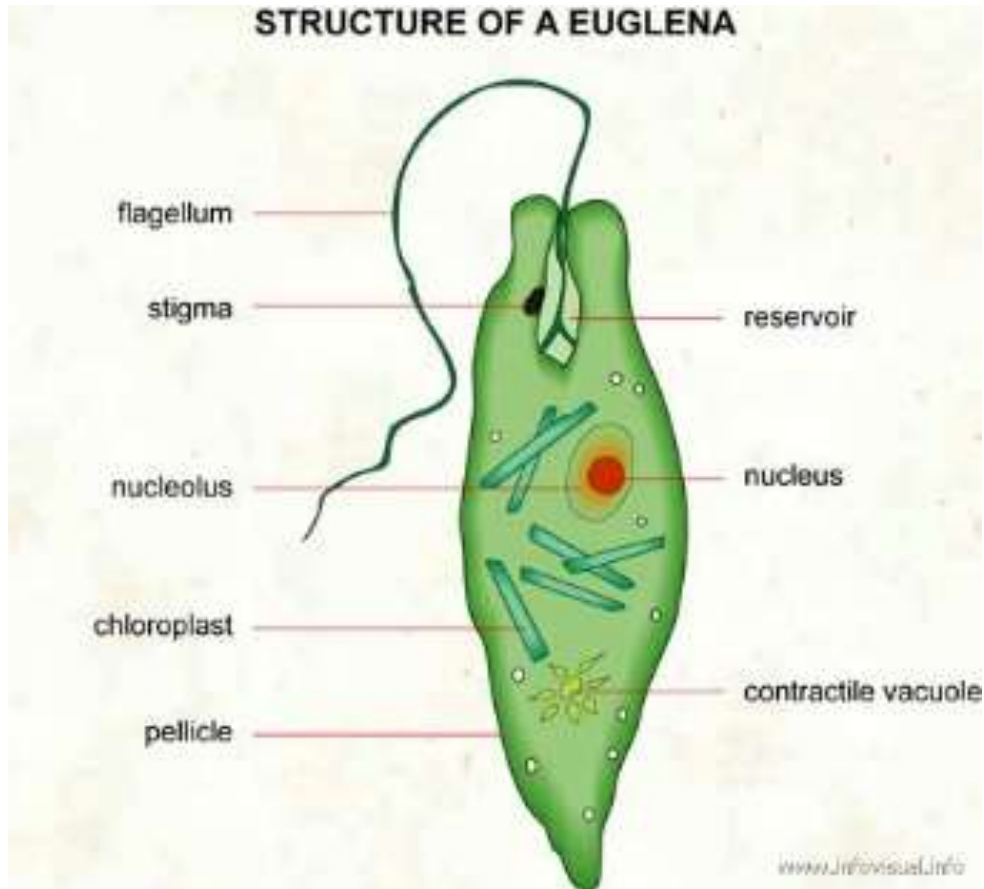
مثل : طحلب *Fucus*



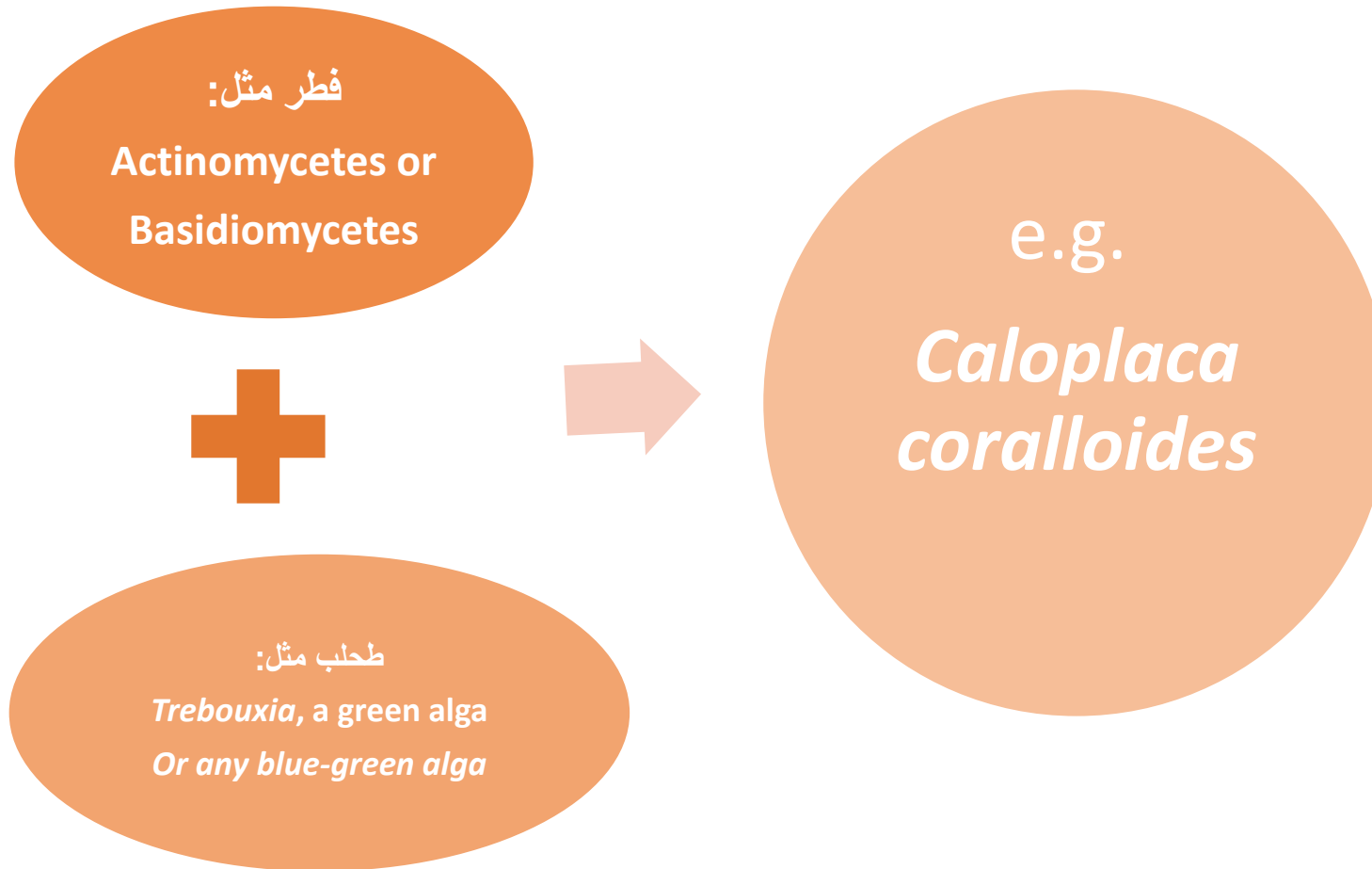
6- Euglenophyta

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



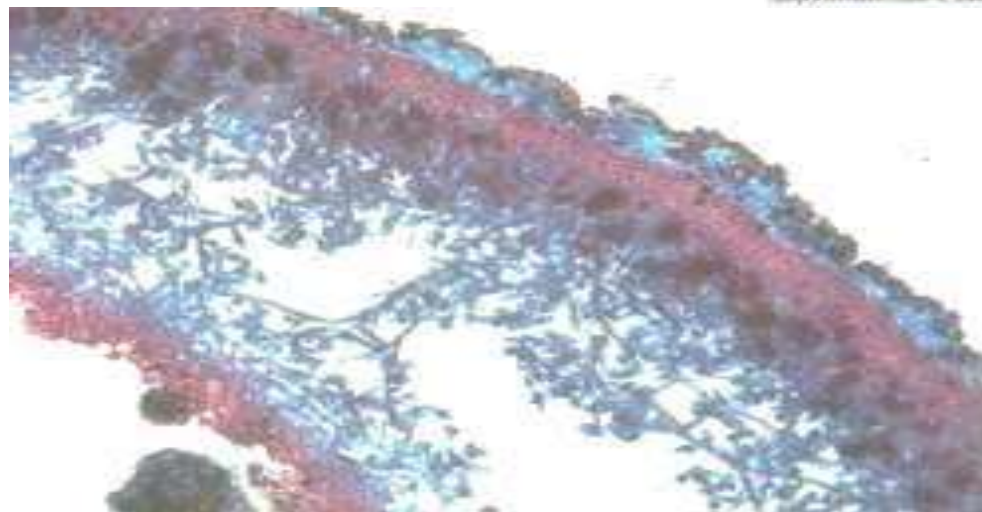
1. **Crustose** - encrusting



2. **Foliose** - leaf-like, no branching



3. **Fruticose** - bush-like
with branching



Any Questions

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Aljawhara Alabbad

