

Classification of Organisms

Taxonomy / Systematics

The branch of biology that deals with classification and nomenclature.

Nomenclature deals with the application of a correct name to a plant or a taxonomic group.



Kingdom: Plantae
Class: Angiosperms
Order: Arecales
Family: Arecaceae
Genus: *Phoenix*
Species: *P. dactylifera*

Taxonomic Hierarchy

Species:

- **Organisms sharing a set of biological traits and reproducing only their exact kind.**

مجموعة من الكائنات الحية تشترك في مجموعة من الصفات الحيوية ولها القدرة على التزاوج فيما بينها. (النوع هو الوحدة الأساسية في التصنيف)

- **Species is the fundamental unit in taxonomy**

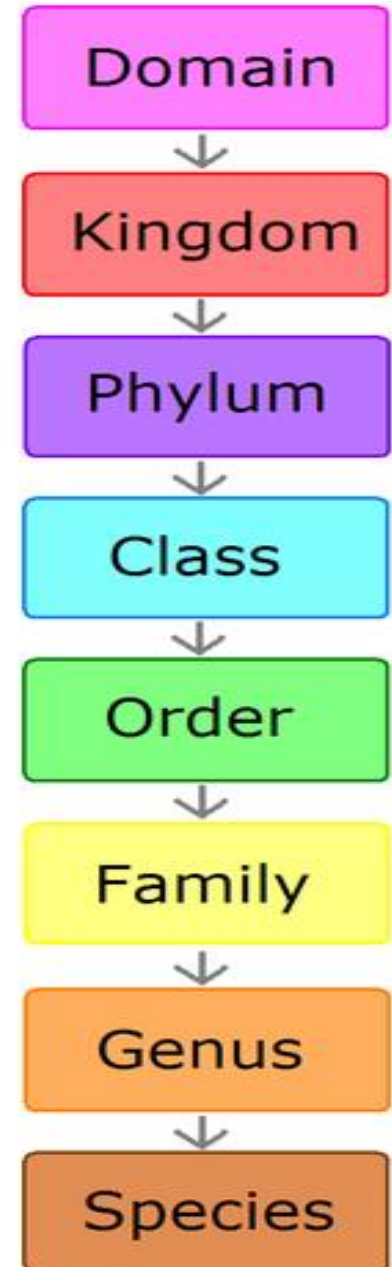
Genus: Closely related species

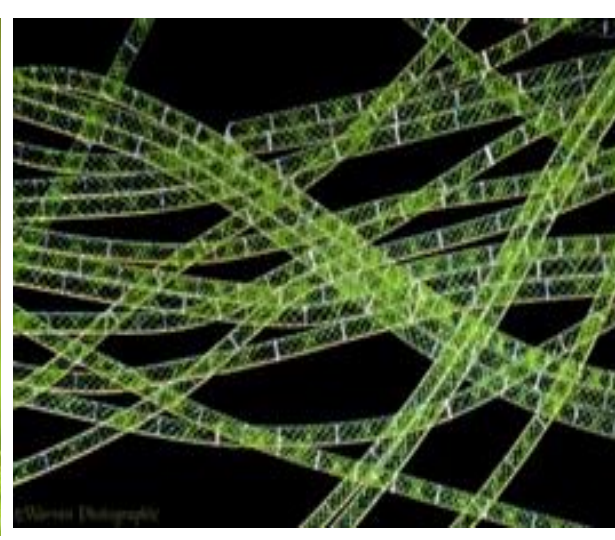
Family : Closely related genera

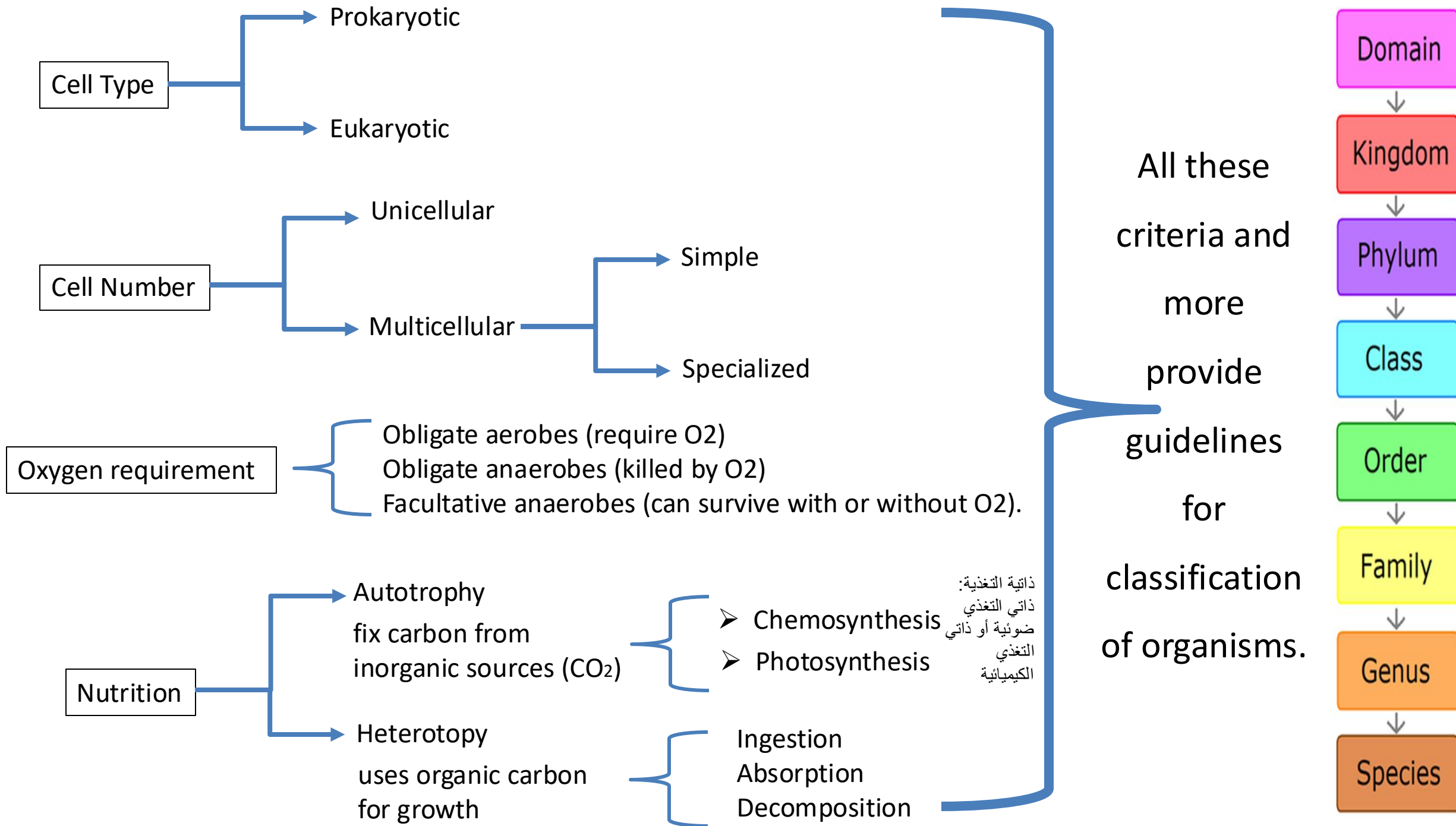
Order : Closely related families

Class : Closely related order

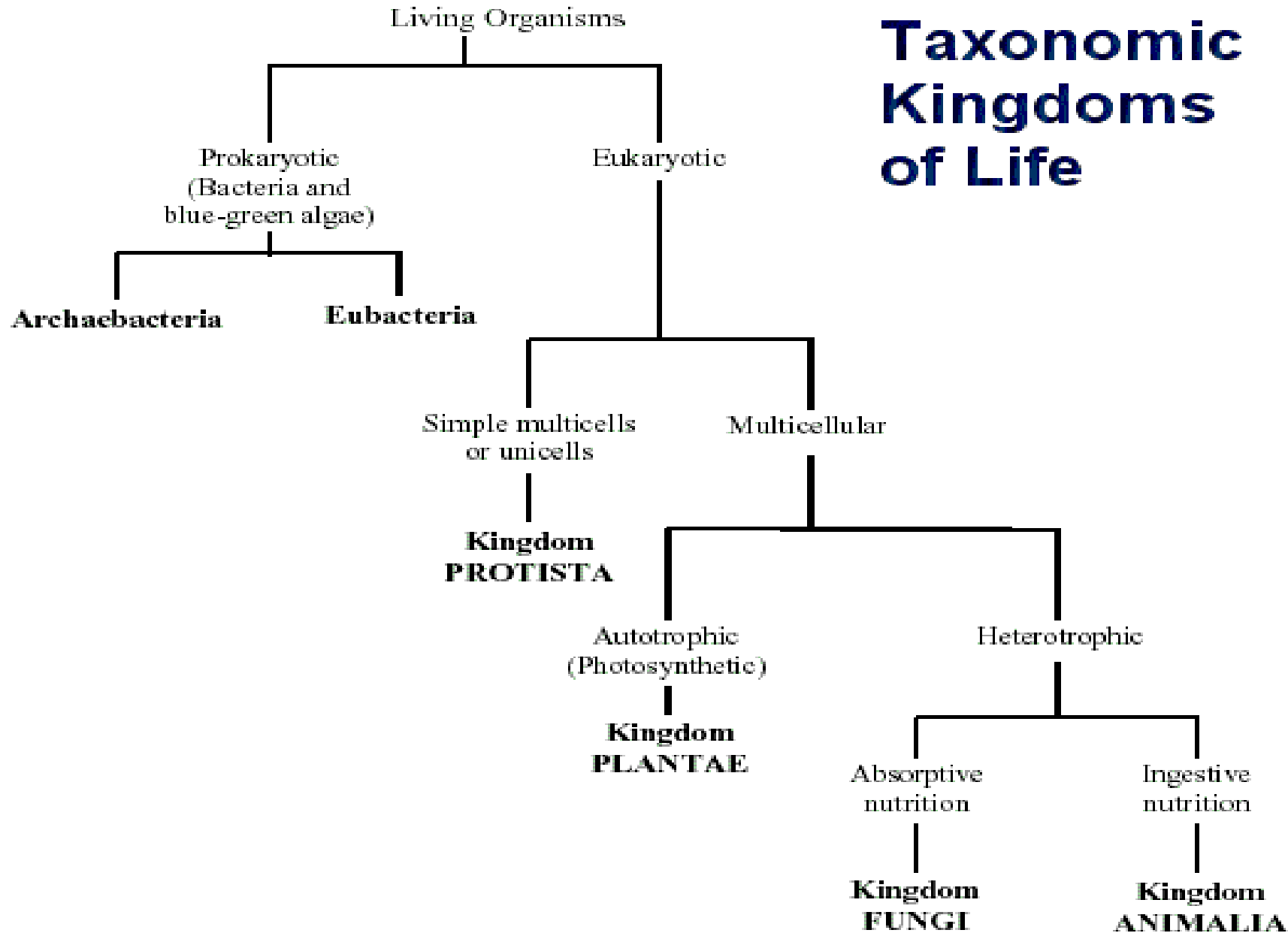
Phylum : Related classes







Classification of Organisms



- The most basic category of organisms is called a *kingdom*.

- Most scientists divide organisms into **five** major kingdoms.

وتسمى الفئة الأساسية للكائنات "مملكة".

معظم العلماء يقسم الكائنات الحية إلى خمس ممالك رئيسية

Biological Kingdoms

Five kingdom system:



Six kingdom system:



Three domain system:



Eight kingdom system:



Eu-bacteria

1. Unicellular
2. Prokaryotes
3. Both autotrophic and heterotrophic.
4. Reproduce by binary fission
5. Most of the bacteria causing disease in human.

Archae-bacteria

1. Unicellular
2. Prokaryotes with distinctive cell membranes.
3. Mostly heterotrophic, but some are autotrophic producing food by chemosynthesis.
4. Many live in harsh environments such as Sulfurous Hot Springs, very salty lakes, and in anaerobic environments, such as the intestines of mammals.

Protista

1. Unicellular and a few simple multicellular that is not specialized to perform specific functions.
2. Eukaryotes that are NOT Plants, Animal, or Fungi.
3. Protista include: subkingdom
 1. Phytotrophs (plant-like protists) (photosynthetic).
 2. Heterotrophs, Protozoa (animal-like protists) (ingestion).
 3. Decomposers and parasites, (fungus-like protists)(Absorption)

Plantae

1. Multicellular and specialized for different functions.
2. Eukaryotic and carry out photosynthesis.
3. Plant cells have cell walls, that contain the polysaccharide cellulose.

Fungi

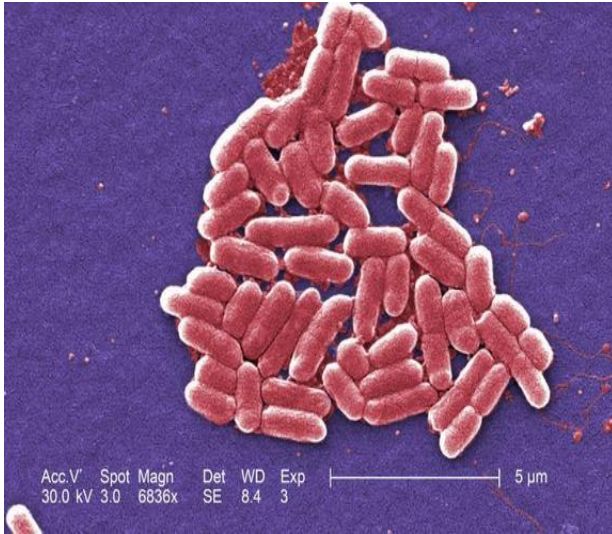
1. Mostly multicellular.
2. Eukaryotes.
3. The cell wall of fungi are made up of chemical chitin.
4. Heterotrophic and obtain their nutrients by releasing digestive enzymes into a food source.
5. act either as decomposers or as parasites in nature.

Animalia

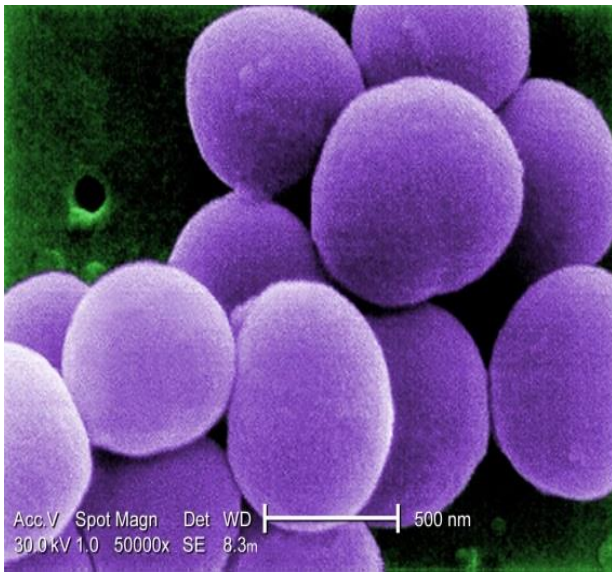
1. Multicellular.
2. Eukaryotic
3. Heterotrophic.
4. Animal cells have NO CELL WALLS.
5. Most animals can move from place to place.
6. Fish, Birds, Reptiles, Amphibians, and mammals-including humans belong to the Kingdom Animalia.
7. This Kingdom also includes sponges, jellyfish, worms, sea stars, and insects.

<u>Kingdom</u>	<u>Cell type</u>	<u>Number of cells</u>	<u>Nutrition</u>
Archaeobacteria	prokaryotic	unicellular	autotrophy and heterotrophy
Eubacteria	prokaryotic	unicellular	autotrophy and heterotrophy
Protista	eukaryotic	unicellular and multicellular	autotrophy and heterotrophy
Fungi	eukaryotic	unicellular and multicellular	heterotrophy
Plantae	eukaryotic	multicellular	autotrophy and (rarely) heterotrophy
Animalia	eukaryotic	multicellular	heterotrophy

Eubacteria



Escherichia coli



Staphylococcus

Archaeobacteria



Halobacterium sp

Protista



Protozoa:

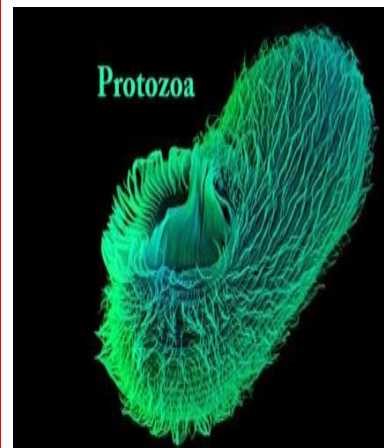
Ingestive
animal-like
protists

Algae:

Photosynthetic
plant-like
protists

Slime Molds:

Absorptive,
fungus-like
protists.



Six kingdom system:



Eight kingdom system:



- **Algae** is a collective term for many organisms, so it is classified into different kingdoms.
- **Algae** belongs to four different kingdoms, including
 - I. Kingdom Bacteria
 - II. Kingdom Plantae
 - III. Kingdom Protista
 - IV. Kingdom Chromista.
- The classification of **algae** depends on its feature; however, the majority of algae are plants, so they are in the kingdom plantae.

Survey of Microorganisms

Microorganism is a microscopic organism; any organism too small to be viewed by the unaided eye.

- 1. Viruses**
- 2. Bacteria**
- 3. Cyanobacteria**
- 4. Algae**
- 5. Fungi**
- 6. protozoa**

VIRUSES

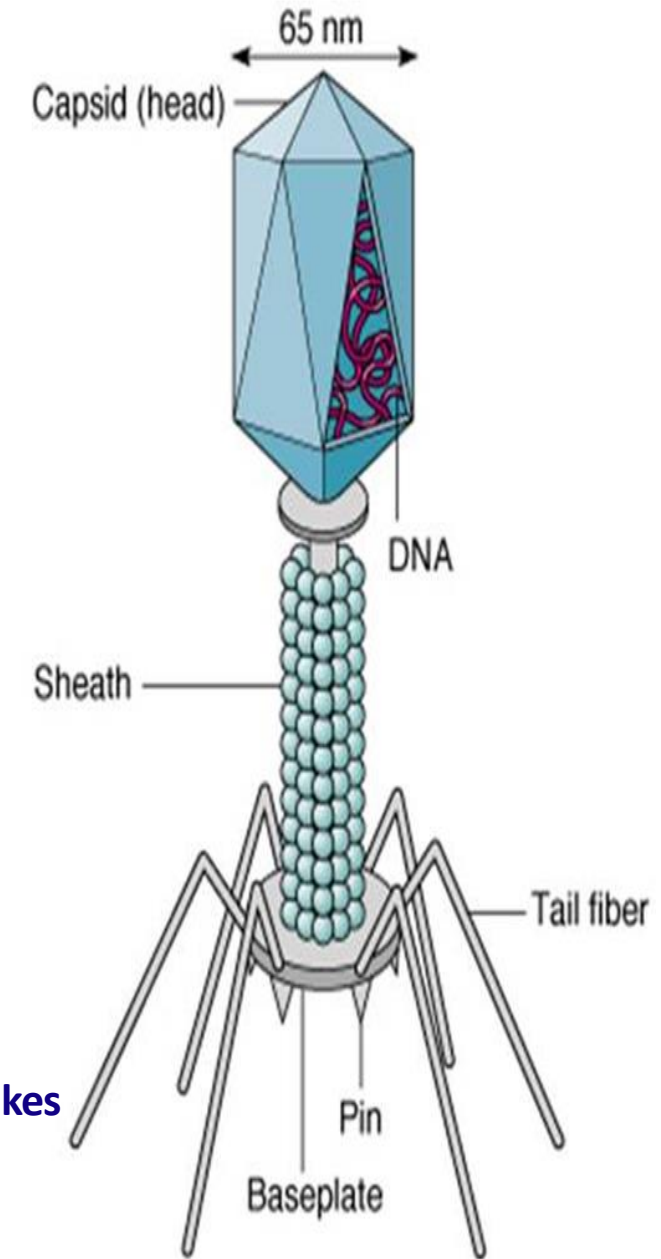
- **Obligated intracellular parasite.** متطفلة اجباريا داخل الخلايا.
- **host specific:** بعضها لها عائل خاص بمعنى انها متخصصة في التطفل فتتطفل على كائن دون اخر او عضو دون اخر . وتقسم وفقا للعائل الى : فيروسات البكتيريا (بكتيروفاج) وفيروسات حيوانية وفيروسات نباتية.
 - **bacteriophage**
 - **animal virus**
 - **plant virus**
- **according to its genetic material** ووفقا لمادتها الوراثية
 - **DNA virus** فيروس DNA
 - **RNA virus** فيروس RNA

- **Shape:** الشكل:
معظم الاشكال شائعة هي متعدد الوجوه، وبعضها ذا شكل حلزوني

Most common shape is icosahedral , some are helical shape

- **Structure:** البناء:
غلاف بروتيني مواد وراثية او كابسيد . بعض الفيروسات الحيوانية لها بزوائد من البروتين السكري
- Protein capsid and genetic material some animal virus have envelope with glycoprotein spikes**

- **Life cycle: lytic infection lysogenic infection** دورة الحياة: عدوى معتدلة وعدوى ضارية
وترتبط بعض الفيروسات الحيوانية بشكل وثيق مع أنواع معينة من السرطان
- **Some animal viruses are closely associated with certain cancers**

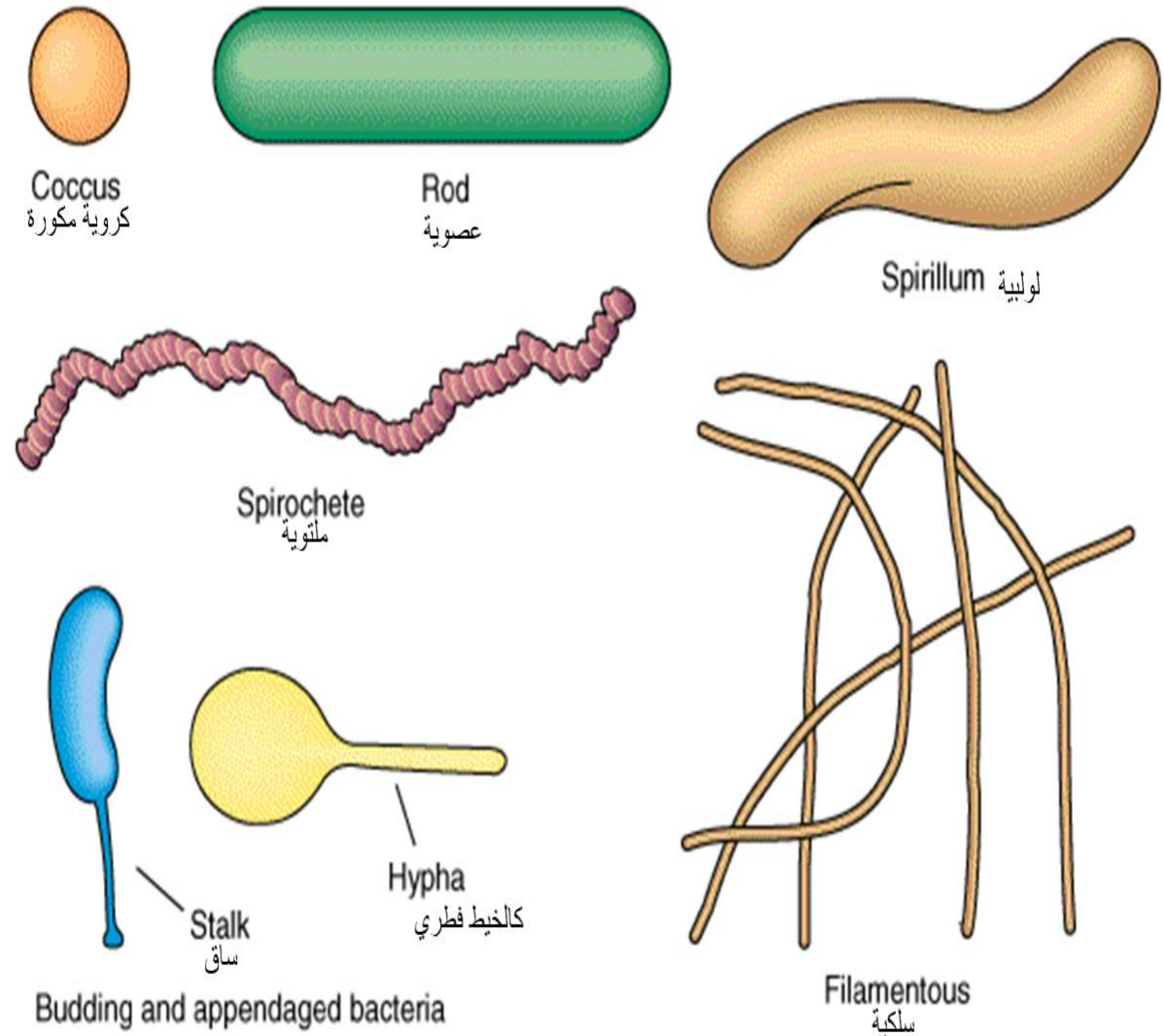


(a) A T-even bacteriophage

BACTERIA

- ❑ Bacteria are prokaryotes.
- ❑ Three are different shapes of bacteria:
 - Cocci (spherical, ovoid, or generally round shape)
 - Bacilli (a rod-shaped bacterium)
 - Spiral (Bacteria of spiral / helical shape)

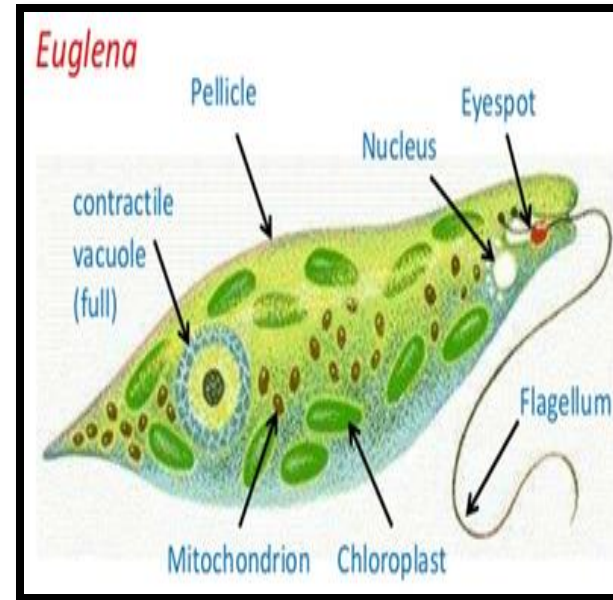
لها ثلاثة أشكال: المكورات كروية ، العصيات وحلزونية



Algae

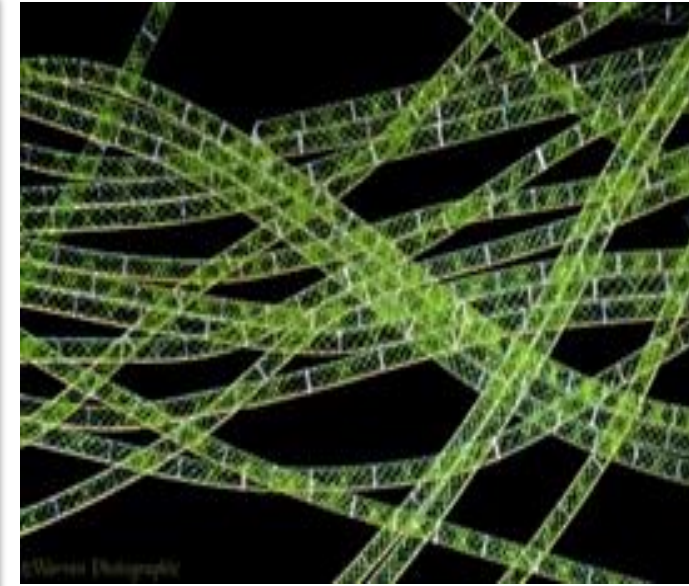
1. **Euglenoids**
eg. *Euglena*
food storage - lipoid polysaccharide – paramylum

الطحالب اليوجلينية
على سبيل المثال اليوجلينا (الحنديرة)
تخزن المواد الغذائية – بصورة السكريات الدهنية - باراميلوم



2. **Green algae**
eg. *Spirogyra* and *Chlamydomonas*
food storage – starch

الطحالب الخضراء
على سبيل المثال. كلاميدوموناس
تخزين المواد الغذائية - بصورة النشا



Spirogyra

3. **Golden Brown algae**
eg. *Diatoms*
food storage – oil and leucosin (a polysaccharide)
have fucoxanthin, a brownish pigment

الطحالب البنية الذهبية
على سبيل المثال. الدياتومات
تخزين المواد الغذائية – زيوت ولوكوزين (سكريات متعددة)
تحتوي فوكوزانثين، صبغة بنية اللون



Diatoms

4. **Brown Algae**
Mainly marine water algae
food storage – laminarin, a polysaccharide and mannitol, a sugar alcohol

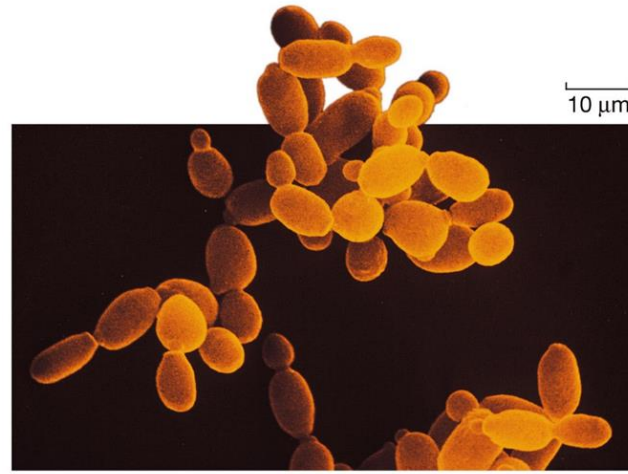
الطحالب البنية
طحالب المياه البحرية أساسا
تخزين المواد الغذائية - لامينارين،
سكريات متعددة ومانيتول



Brown Algae

Fungi

- The fungi are **not true plants because** they do not contain chlorophyll.
- Fungi are a kingdom of mostly microscopic organisms that are closely related to animals.
- Fungi are almost always invisible to the naked eye. At certain times, some fungi will produce large 'fruiting bodies' called mushrooms that produce huge numbers of spores for reproduction.
- The cell walls of fungi are made from a compound called 'chitin'.



Saccharomyces sp.



➤ The Fungi live as either **single-celled** organisms or **multicellular** organisms.

➤ **Multicellular** fungi:

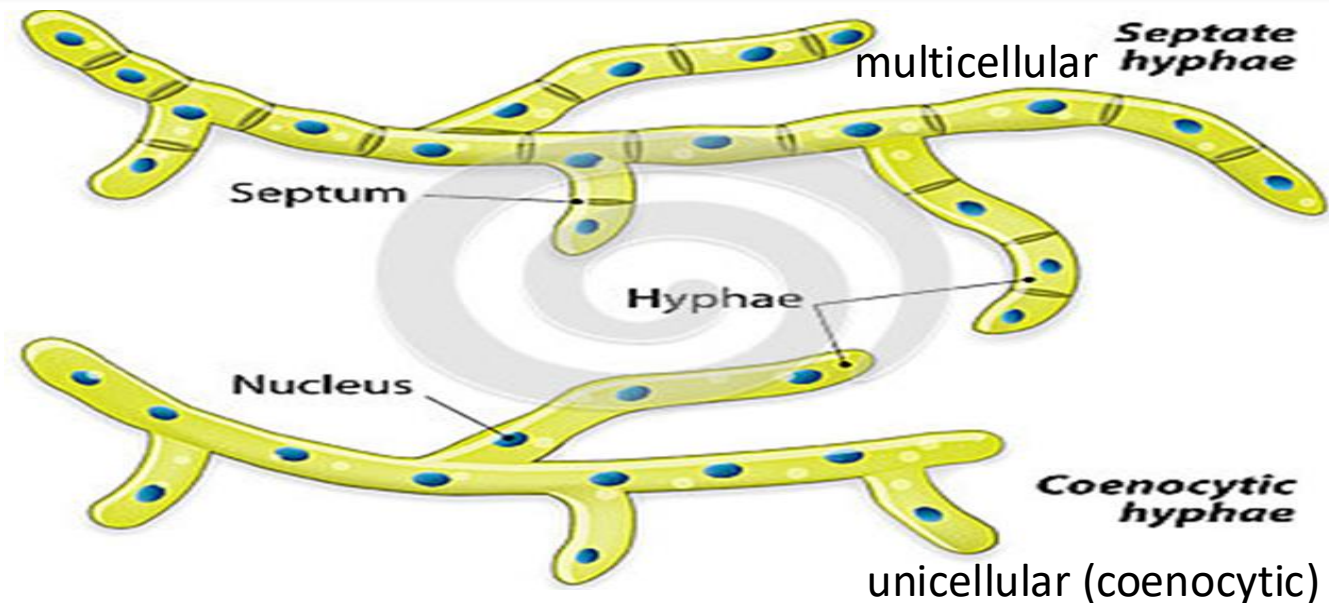
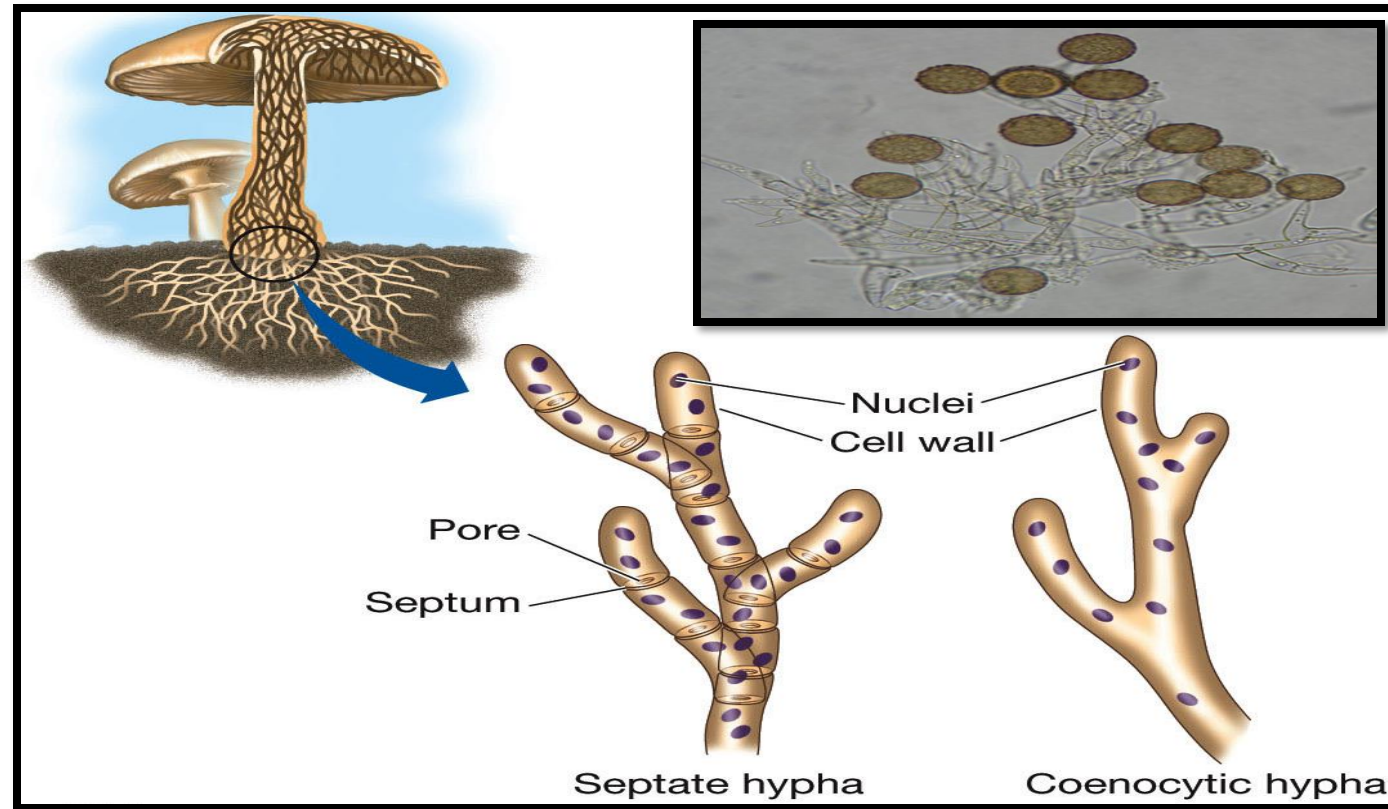
1. Most of the body of a fungi is made from a network of long, thin filaments called **'hyphae'**.
خيوط فطرية

A. Some hyphae have incomplete cross walls or **septa**, and are called **septate**.
حواجز

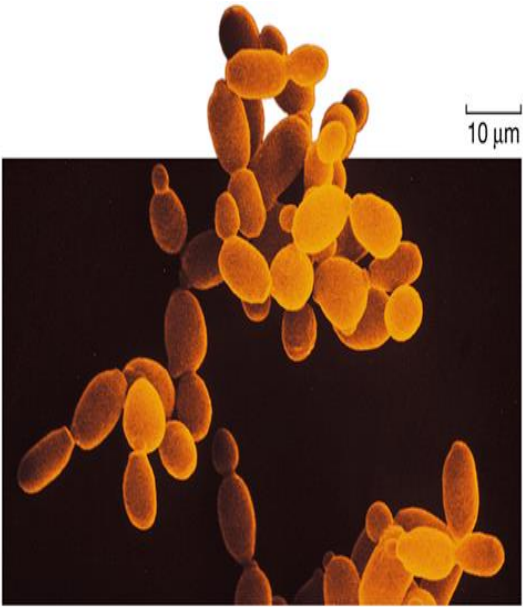
B. Hyphae without septa are called **coenocytic**.
مدمج خلوي

2. When the hyphae create a complex network of filaments it is called a **'mycelium'**.
غزل فطري

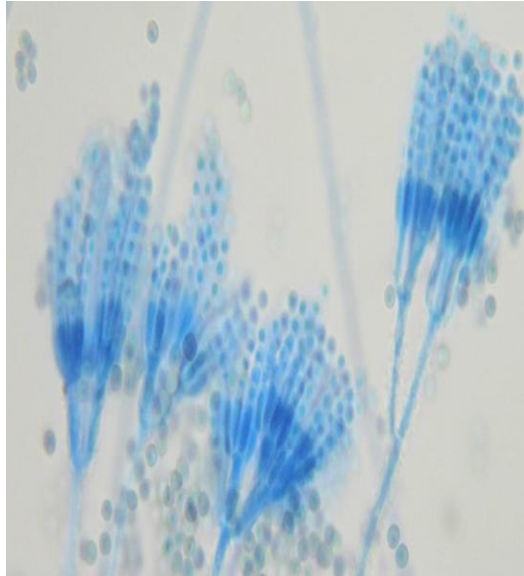
3. Because the hyphae of fungi are so thin, they have an incredibly **high surface area to volume** ratio. The large surface area makes fungi extremely **well-adapted to absorbing** nutrients from soil and other substrates.



- Single-celled fungi are referred to as yeasts. The vast majority of fungi are multicellular.
- They include spore producing organisms such as **mushrooms**, **yeasts** and **molds**.



Saccharomyces sp. الخميرة



Penicillium



عفن الخبز

Yeast, *Saccharomyces cerevisiae*, is a unicellular fungus, ^{الفطريات الرقية أو الكيسية} belongs to a group called **Ascomycetes**. Yeasts are able to metabolize carbohydrates into alcohol and carbon dioxide. Humans have utilized the fermentation of carbohydrates by yeasts to create fermented foods and drinks such as bread, beer and wine.

A mushroom is a reproductive structure common to all species of fungi within the division **Basidiomycetes**.

Molds belong to a group of fungi called **zygomycetes** ; examples are bread and fruit molds.

الفطريات
الزيجوتية

الفطريات
البازيدية

LICHENS: Symbiotic Association (Nature's Perfect Marriage)

- Lichens is association of **fungus** and photosynthetic organism (**algae**)
الأشنيات: عبارة عن فطر + كائن حي ضوئي التغذية
- Mostly **ascomycetes** fungi associated with lichens
الفطريات الداخلة في التكافل هنا معظمهم من الفطريات الزقية
- Photosynthetic partner—cyanobacterium or alga, or both.
الشريك الضوئي قد يكون من البكتيريا سيانية أو الطحالب، أو كلاهما.
- Can survive the harshest environmental condition.
يمكن لها البقاء على قيد الحياة في أقسى البيئات على سطح الأرض.
- Lichens are very sensitive to toxic compounds—
حساسة للغاية للمركبات السامة وتعتبر مؤشرات جيدة لتلوث الهواء.
الأشنيات هي علامات بيئية كبيرة
- Lichens are great ecological markers
تستخدم كعلاج دوائي
- Many Lichens have medicinal properties

