

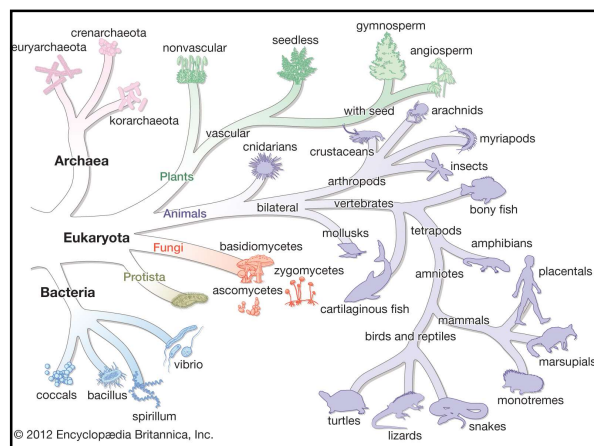
## LESSON 7

# STUDY OUTLINE OF MICROORGANISMS

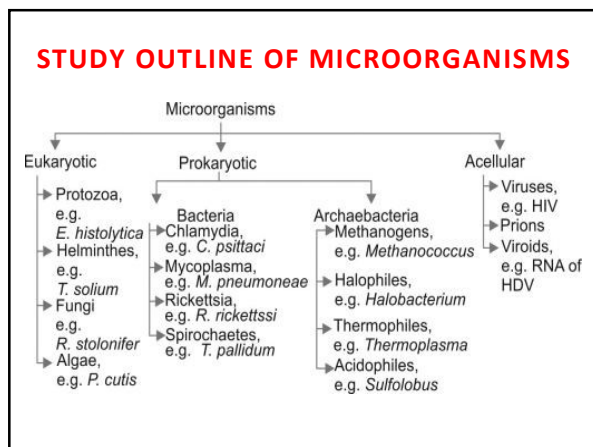
## Vocabulary

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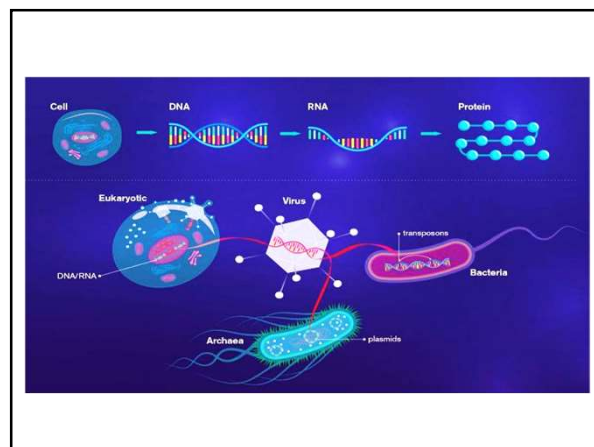
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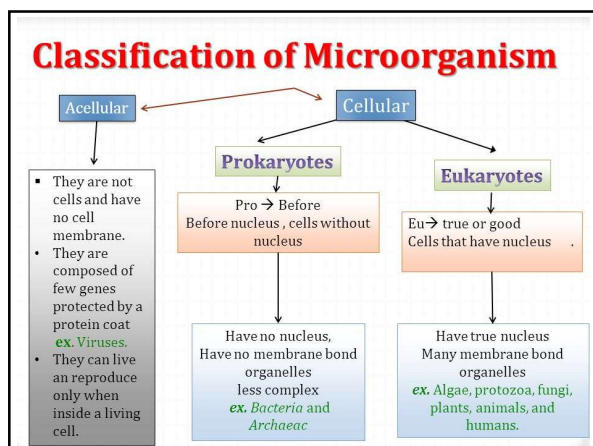
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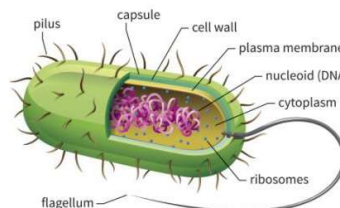


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### Bacteria

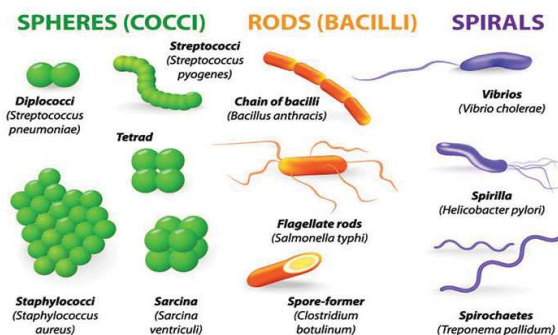
Bacteria are one-celled organisms. Because they have no nucleus, the cells are described as prokaryotes.

Most bacteria have a peptidoglycan cell wall; they divide by binary fission; and they may possess flagella.

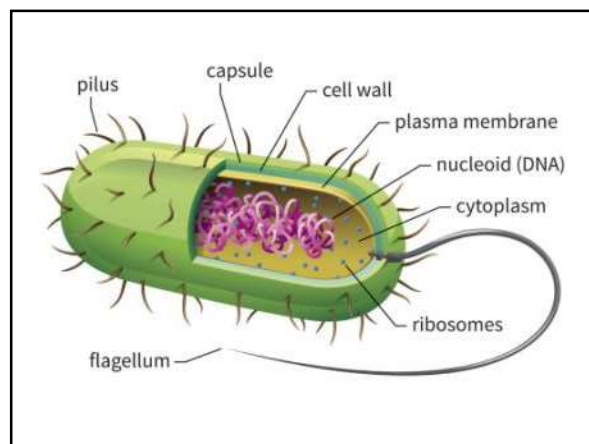


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The three major basic shapes of bacteria are bacillus, coccus, and spiral.



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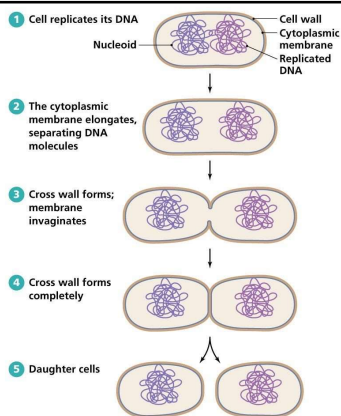


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## Binary fission

/ˌbaɪ.nə.ɪˈfɪʃ.ən/

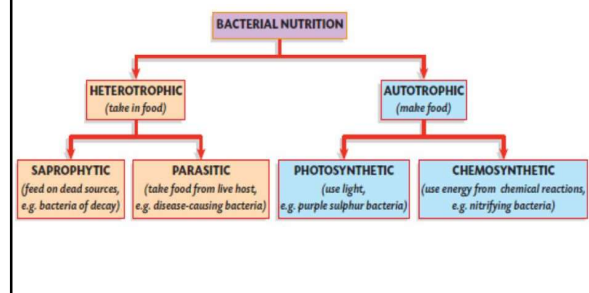
the process by which organisms with only one cell create new organisms by dividing



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Bacteria can use a wide range of chemical substances for their nutrition.



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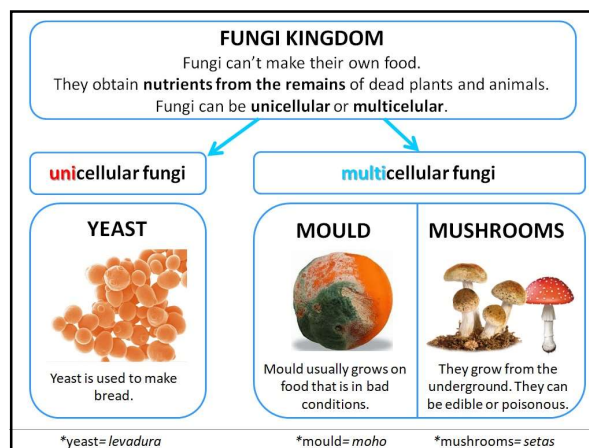
## Fungi

Fungi (mushrooms, molds, yeasts) have eukaryotic cells (with a true nucleus).

Most fungi are multicellular.

Fungi obtain nutrients by absorbing organic material from their environment.

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\*yeast= levadura

\*mould= moho

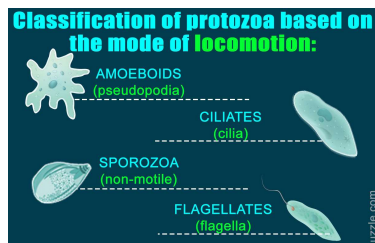
\*mushrooms= setas

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## Protozoans

Protozoans are unicellular eucaryotes and are classified according to their means of locomotion.

Protozoans obtain nourishment by absorption or ingestion through specialized structures.



Locomotion  
= movement

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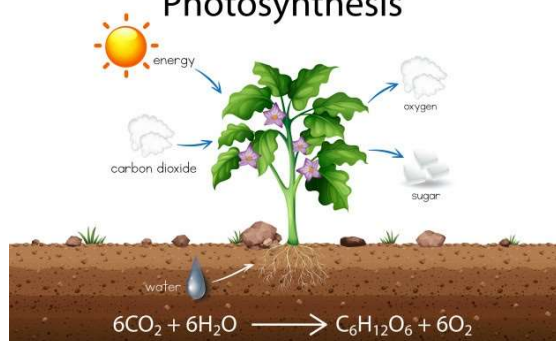
## Algae

Algae are unicellular or multicellular eucaryotes that obtain nourishment by photosynthesis.



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## Photosynthesis

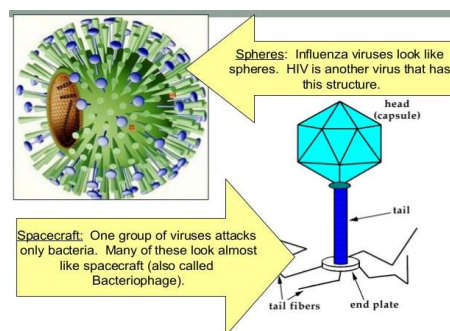


Algae produce oxygen and carbohydrates that are used by other organisms.

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## Viruses

Viruses are noncellular entities that are parasites of cells.



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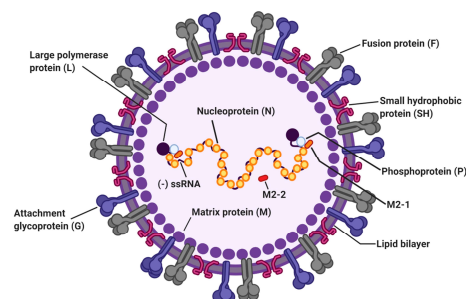
## Parasite (adj) /'per.ə.saɪt/

- An animal or plant that lives on or in another animal or plant of a different type and feeds from it
- A parasite is also a person who uses others to obtain an advantage without doing anything in exchange

• ký sinh trùng

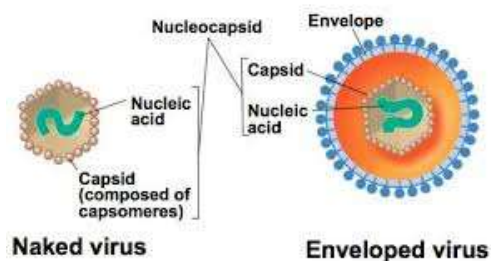
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Viruses consist of a nucleic acid core (DNA or RNA) surrounded by a protein coating.



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An envelope may surround the coating.



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Virus

<https://www.youtube.com/watch?v=8FqITslU22s>

SARS-CoV-2 virus transmission leading to COVID-19:

- <https://www.youtube.com/watch?v=PSnSo9kYIH4>
- <https://www.youtube.com/watch?v=5GELx45kWPw>

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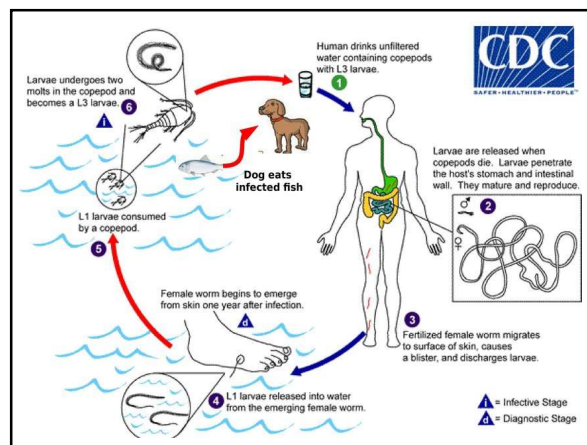
### Multicellular animal parasites

The principal groups of multicellular animal parasites are flatworms and roundworms, collectively called helminths.

The microscopic stages in the life cycle of helminths are identified by traditional microbiologic procedures.



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### Modern Developments in Microbiology

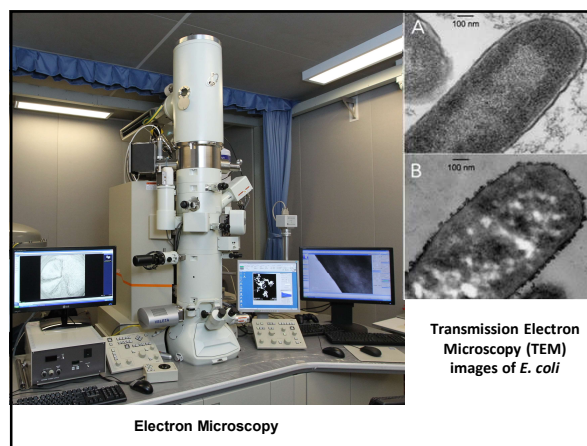
The study of AIDS, analysis of interferon action, and the development of new vaccines are among the current research interests in immunology.

New techniques in molecular biology and electron microscopy have provided tools for advancement of our knowledge of virology.

The development of recombinant DNA technology has helped advance all areas of microbiology.

**Interferon** /*in.təˈfɪr.ən/* (n)  
one of several proteins in the body that are produced by cells as a reaction to infection by a virus

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## Naming and Classifying Microorganisms

In a nomenclature system designed by Carolus Linnaeus (1735), each living organism is assigned two names.

The two names consist of a genus and specific epithet, both of which must be underlined or italicized.

For example, the bacteria used in yogurt production would be classified as follows...

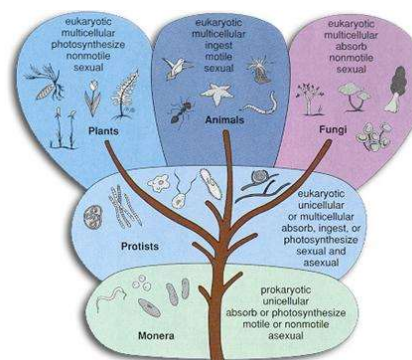
Kingdom: Bacteria  
Phylum: Firmicutes  
Class: Bacilli  
Order: Lactobacillales  
Family: Lactobacillaceae  
Genus: *Lactobacillus*  
Species: *L. delbrueckii*  
Subspecies: *L. d. bulgaricus*



Known as the "Father of Modern Taxonomy" Carl Linnaeus was the first to consistently name plants and animals using the binomial system of Latin names for genus and species.

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In the five-kingdom system, all organisms are classified into procaryotae (or monera), protista, fungi, plantae and animalia.



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## Microbes and human welfare

Microorganisms **degrade** dead plants and animals and recycle chemical elements to be used by living plants and animals.

Bacteria are used to **decompose** organic matter in **sewage**.

**Bioremediation** processes use bacteria to clean up toxic wastes.

Bacteria that cause diseases in insects are being used as biological controls of insect pests. Biological controls are specific for the pest and do not harm the environment.

Using recombinant DNA, bacteria can produce important human proteins, such as insulin, beta-endorphin and hepatitis B vaccine.

Microorganisms can be used to help produce foods. They are also food sources (single-cell protein) themselves.

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## Pest (n) /pest/

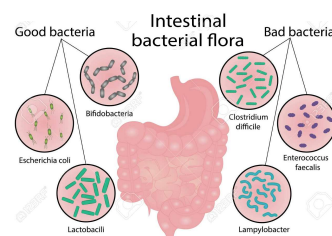
- An insect or small animal that is harmful or damages crops. Common pests such as rats, mice, or cockroaches
- an annoying person, especially a child

• Loài gây hại, vật phá hoại (sâu bọ, súc vật)

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## Microbes and human disease

Everyone has microorganisms in and on the body; these make up the normal flora.



The disease-producing properties of the species of microbe and the host's resistance are important factors in determining whether a person will contract a disease.

### Flora /'flɔːr.ə/ (n)

- all the bacteria and other organisms that live inside an animal
- all the plants of a particular area or period of time

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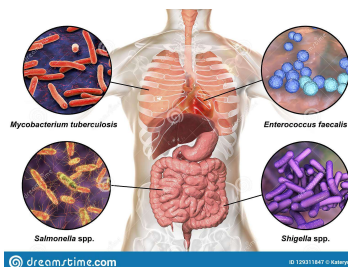
## Microbes in our lives

Living things too small to be seen with the naked eye are called microorganisms. Microorganisms are important in the maintenance of an ecological balance on Earth. Some microorganisms live in humans and other animals and are needed to maintain the animal's health.

Some microorganisms are used to produce tools and chemicals.

Some microorganisms cause disease.

⇒ pathogen

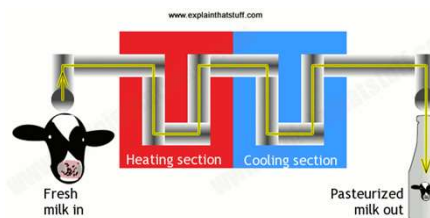


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## Fermentation and Pasteurization

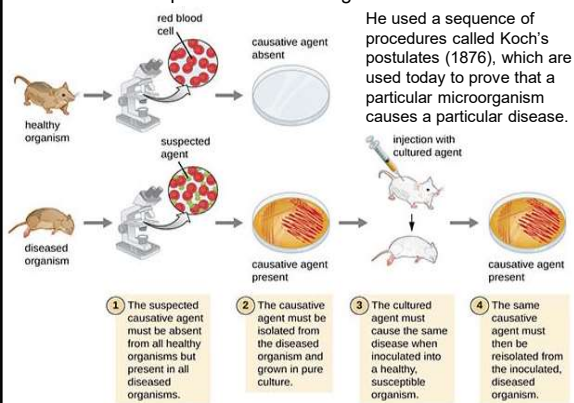
Pasteur found that yeast ferments sugars to alcohol and that bacteria can oxidize the alcohol to acetic acid.

A heating process called pasteurization is used to kill bacteria in some alcoholic beverages and milk.



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Robert Koch proved that microorganisms transmit disease.



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## Vaccination

In a vaccination, **immunity** (resistance to a particular disease) is **conferred** by **inoculation** with a vaccine.

In 1798, Edward Jenner demonstrated that inoculation with **cowpox** material provides humans with immunity from **smallpox**.

About 1880, Pasteur discovered that **virulent** bacteria could be used as a vaccine for **chicken cholera**; he coined the word vaccine.

Modern vaccines are prepared from living virulent microorganisms or killed pathogens, and by recombinant DNA techniques.

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**Immunity (n)**  
/ɪ'mjuː.nə.ti/

• a situation in which you are protected against disease or from legal action

Ex: The vaccination gives you immunity against the disease for up to six months.

→ **Immune** /ɪ'mjun/ (adj): protected against a particular disease or illness by particular substances in the blood

→ **Immunization** /ɪm.jə.nə'zeɪ.jən/ (n)

→ **Immunology** /ɪm.jə'nɒ:l.ə.dʒi/ (n)

• Sự miễn dịch

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**Confer (v)**  
/kən'fɜː/

• to talk together and exchange ideas, often with the intention of reaching a decision about something

Ex: I need to confer with my lawyer.

• to give an honor, official title, or ability to someone

Ex: The US Constitution confers certain powers on the president.

→ **conference** /'kɒnfərəns/ (n) an event at which there are a lot of talks and meetings about a particular subject

• Bàn bạc, hỏi ý kiến; phong, ban

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### Inoculation (n)

/ɪˌnɒː.kjəˈleɪ.ʃən/

- the action of giving someone a weak form of a disease as protection against it

→ inoculate (v)

- Sự tiêm chủng

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### Cowpox (n) /'kəʊ.pɔːks/

- an infectious disease caused by the cowpox virus
- bệnh đậu mùa ở động vật

### Smallpox (n) /'smɔːl.pɔːks/

- an extremely infectious disease that causes a fever, spots on the skin, and often death
- bệnh đậu mùa

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### Cholera (n)

/'kɒː.lə.ə/

- a serious infection of the bowels caused by drinking infected water or eating infected food, causing diarrhoea, vomiting, and often death

- Bệnh tả

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### Virulent (adj)

/'vɪr.jə.lənt/

- (of a disease) dangerous and spreading quickly, or (of poison) having an effect very quickly:
- Ex: a virulent strain of flu

- Độc hại

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