

# Microbiology bio 231

Lecture 1

# The definition of microbiology

**Micro** - Too small to be seen by the naked eye.

Bio - Life **logo** - study about

### **Microbiology** -

is the study of life too small to be seen without magnification.

### Microorganisms microscopic organisms - commonly referred to as "germs, parasites,

viruses, agents..." exist as single cells, multicellular or clustered cells.







## Classification system

In 1978, Karl Worse classified all living things into three domains. he developed a cell-based classification system:

- **bacteria**: prokaryote, single-celled, cell wall contains peptidoglycan.
- **Archaea**: prokaryote, single-celled, cell wall doesn't contain peptidoglycan. lacksquare
- Eukarya:
  - -**Protista** (protozoa, slim molds, algae)
  - -**Fungi** (multicellular, unicellular yeast)
  - -**Plants** (flowering plants)
  - -Animals (worms, sponges, insects)

# Major organisms included in the study of microbiology

- Bacteria Prokaryotic
- Protozoa Eukaryotic
- Algae Eukaryotic
- Parasites Eukaryotic
- Fungi (Yeasts and Molds) Eukaryotic
- Viruses
- Archea Prokaryotic



## Naming microorganisms

scientific nomenclature - to name every microorganism following a specific system

**Genus** - always capitalized

**species** -lowercase

Both italicized or underlined

*Escherichia coli* or <u>Escherichia coli</u>





# Microbes harmful effects

- Infections (pneumonia, tuberculosis)
- Epidemics
- Food spoilage
- Human Diseases (HIV, Lyme)
- Plant Diseases
- Including other pathogenic microorganisms

## **1-Recycling elements**

- Conversion of sulfur, and oxygen (nonessential form of elements) into an essential form to recycle nutrients back into the environment.
  - Decomposers Fungi and bacteria
- Photosynthesis plants, algae, cyanobacteria
- Sewage treatment and recycling water ullet

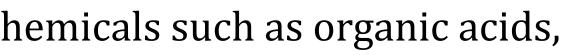






## 2-industry

- Microorganisms are used in the synthesis of industrial chemicals such as organic acids, ulletalcohols
- and many drugs (commercial applications), enzymes, and vitamins.
- Food production such as Cheese, pickles, sauerkraut, green olives, yogurt, soy sauce,  $\bullet$ vinegar,
- Bread, beer, wine, and alcohol.  ${\bullet}$
- alternative fuel microbes produce methane and ethanol. ullet



**3-Bioremediation:** Genera of (Pseudomonas sp. and Bacillus sp.) Has been used to clean toxic waste and pollutants since 1988.

**4-insect Pest Control:** (biological control) the use of bacteria to control the growth of certain types of insects Bacillus thuringiensis to control the growth of Caterpillars **Bollworms Corn borers** 

**5-(Gene Therapy and Genetic Engineering):** Since 1990 a technic called gene therapy has been used to treat patients by inserting certain genes in a chromosome to produce protein.





## 6-Microbes form the basis of the food chain: Marine and freshwater microorganisms

are considered the basis of the food chain.

