

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 Worselt 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.
- **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 Escherichia coli

Microbes harmful effects

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

Microbes benefits

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

Microbes benefits

2-industry

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

Microbes benefits

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.

Microbes benefits

6-Microbes form the basis of the food chain: Marine and freshwater microorganisms are considered the basis of the food chain.

