

# **Bacteriology**

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## **lecture 1: Introduction to bacteriology science, history of bacteriology, Important evolution. Branches of bacteriology, scientists in this field.**

**Microbiology:** is the study of microorganisms usually less than 1mm in diameter

Examples: Viruses, Bacteria, Fungi, Algae, Protozoa's

Microbiology may be interested in specific types of organisms:

- Virology - viruses
- Bacteriology - bacteria
- Phycology - algae
- Mycology - fungi
- Protozoology - protozoa

Microbiologists may be interested in various characteristics or activities of microorganisms:

- Microbial morphology
- Microbial cytology
- Microbial physiology
- Microbial ecology
- Microbial genetics and molecular biology
- Microbial taxonomy

### **Branches of bacteriology**

1. Food microbiology : microorganisms are essential for the production of foods such as cheese, yogurt, bread, beer, wine and, other fermented foods.
2. Industrial microbiology in the production of high value products such as drugs, chemicals, fuels, and electricity.
3. Medical microbiology: is a branch of medical science concerned with the prevention, diagnosis and treatment of infectious diseases. deal with pathogenic microorganisms
4. soil microbiology: Soil microbiology is the study of organisms in soil, Microorganisms in soil are important because they affect soil structure and fertility. their functions, and how they affect soil properties

## Historical Perspectives

### ROBERT HOOKE

One of the most important discoveries of biology occurred in 1665, with the help of a crude microscope, when Robert Hooke stated that life's smallest structural units were cells.

### ANTONY VAN LEEUWENHOEK

His single-lens magnified 50-300X magnification

### SPONTANEOUS GENERATION

Early belief that some forms of life could arise from "vital forces" present in nonliving or decomposing matter, abiogenesis. In other words, organisms can arise from non-living matter.

### LOUIS JABLOT

In 1670 Jablot conducted an experiment in which he divided a hay infusion that had been boiled into two containers: a heated container that was closed to the air and a heated container that was freely open to the air. Only the open vessel developed microorganisms. This further helped to disprove abiogenesis.

**Edward Jenner:** 1796 – First vaccine (smallpox)

**Richard Petri,** another of Koch's assistants, developed the Petri dish

### JOHN TYNDALL (1820 – 1893)

In 1876 discovered that there were two different types of bacteria.

- a) Heat sensitive or heat labile forms (vegetative cells) easily destroyed by boiling
- b) Heat resistant types known as an endospore
- Tyndall demonstrated that alternate process of heating & cooling if repeated five times, can kill all the endospores.
- This is known as Sterilization process or Tyndallization

### GOLDEN AGE OF MICROBIOLOGY

The period from 1860 to 1900 is often named the Golden Age of Microbiology. During this period, rapid advances, spear-headed by Louis Pasteur and Robert Koch, led to the establishment of microbiology as a science.

### LOUIS PASTEUR: Father of bacteriology and immunology

In 1864 Pasteur established the relationship between microbes and disease in preventing wine from spoiling by using the process termed pasteurization. This process kills bacteria in the alcohol by heat, thus preventing the formation of acetic acid (vinegar).

1885 - Vaccine against Rabies ,Also developed vaccine against anthrax.

\*Pasteurization technique

\*Developed the germ theory of disease

**Robert Koch (1843 - 1910),**

- 1884 Koch's Postulates of Disease Transmission
- In 1860 developed an elaborate technique to isolate & identify specific Pathogens that cause specific diseases. He isolated the anthrax bacterium.

**Joseph Lister (1827 - 1912) :**developed a system of surgery designed to prevent microorganisms from entering wounds – phenol (Carbolic Acid) sprayed in the air around the surgical incision

**Alexander Fleming:**1929 Discovery of Penicillin(first antibiotic)

**Reska (1938) –** First Electron Microscope,The electron microscope is capable of magnifying biological specimens up to one million times.

**Watson and Crick (1953) :** determined the structure of DNA. They used their research, together with the research of Franklin and Wilkins to determine the structure of the DNA molecule.