

## Introduction to Bacteriology

Microorganisms can be found in every ecosystem and in close association with every type of multicellular organism. They populate the healthy human body by the billions as benign passengers, and even as participants in bodily functions. For example, bacteria play a role in the degradation of intestinal contents. In this volume, we primarily consider the role of microorganisms (that is, bacteria) in the initiation and spread of human diseases. Those relatively few species of microorganisms that are harmful to humans, either by production of toxic compounds or by direct infection, are characterized as pathogens.

In our study we focus on microbiology is the study of living organisms of microscopic size. Medical microbiology is the subdivision concerned with the causative agents of infectious disease of man, the response of the host to infection and various methods of diagnosis, treatment and prevention.

**Branches of bacteriology:** there are four branches include:-

- 1-**Medical bacteriology** (important medical bacteria)
- 2-**Industrial bacteriology** (fermentation process by microorganism)
- 3-**Food bacteriology** (probiotic bacteria in food ex: lactobacillus)
- 4-**Soil bacteriology** (useful bacteria in soli ex: bacteria fix nitrogen)

## History of Bacteriology:

- 1676 **Anton van Leeuwenhoek** first discovered bacteria with a single lens microscope.
- Ferdinand Cohn** identified some of the first photosynthetic bacteria and proposed taxonomy for this microorganism.
- 1828 **Christian Gottfried Ehrenberg** introduced the name bacterium.
- 1857 **Louis Pasteur** demonstrated that the lactic acid fermentation is caused by the growth of microorganisms.
- 1876-77 **Robert Koch** demonstrated that anthrax is caused by *Bacillus anthracis*.
- 1877 **Thomas J. Burrill** first discovered bacteria as causative organisms of plant diseases.
- 1884 Danish Physician, **Hans Christian Gram** developed a widely used microbiological staining technique (Gram staining) that is still used in the identification and characterization of bacteria.
- 1890 **Robert Koch** founder of modern bacteriology published the postulates which are four criteria designed to establish a relationship between a causative microbe and a disease.
- 1910 **Paul Ehrlich** developed the first drug for syphilis.
- 1928 British bacteriologist **Frederick Griffith** observed that non virulent pneumococcal bacteria became virulent when injected into mice along with dead virulent *Pneumococcus* thus initiating the understanding of gene transfer among bacteria.

1947 **Lederberg and Tatum** showed that the bacterium *Escherichia coli* entered a sexual phase during which it could share genetic information through bacterial conjugation.

### **Koch's postulates**

According to Koch's postulates, a microorganism can be accepted as the causative agent of an infectious disease only if the following conditions are satisfied:

**Postulate 1:** The organism should be regularly found in the lesions of the disease.

**Postulate 2:** It should be possible to isolate the organism in pure culture from the lesions.

**Postulate 3:** Inoculation of the pure culture into suitable laboratory animals should reproduce the lesion of the disease.

**Postulate 4:** It should be possible to reisolate the organism in pure culture from the lesions produced in the experimental animals.

Subsequently, an additional fifth criterion introduced states that specific antibodies to the organism should be demonstrable in the serum of patients suffering from the disease.