# History of Microbiology

## Introduction

Microbiology is defined as the study of organisms and agents that are too small to be seen clearly by the unaided eye. To be more simple, microbiology is the study of microorganisms which are the living organisms of microscopic size. Microorganisms are the living organisms that are less than 1 millimeter in diameter which cannot be seen by our naked eye. Microorganisms can be viewed through microscopes and they can exist as single cells or clusters. Microorganisms include the cellular organisms like bacteria, fungi, algae and protozoa. Viruses are also included as one of the microorganism but they are acellular.

### Branches of Microbiology

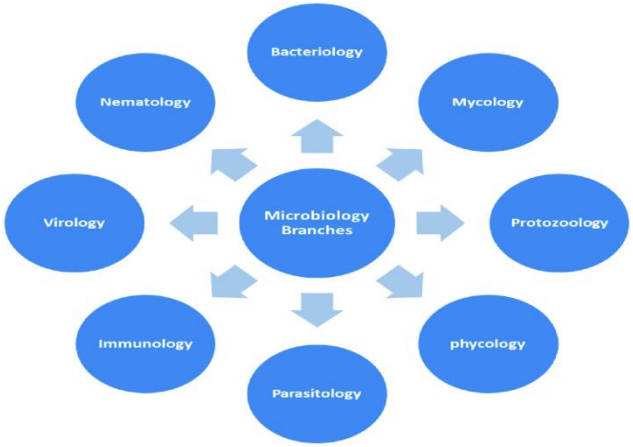


Fig 1.1 Branches of Microbiology

- Bacteriology: the study of bacteria
- Mycology: the study of fungi
- Protozoology: the study of protozoa
- Phycology/algology: the study of algae
- Parasitology: the study of parasites
- Immunology: the study of the immune system
- Virology: the study of viruses

### SCIENTISTS AND THEIR CONTRIBUTION IN MICROBIOLOGY:-

### Louis Pastuer known as 'Father of Microbiology' (1822-1895)

• He was a professor of chemistry in France. His studies on fermentation led him to take interest to work in Microbiology

• He had proposed the principles of fermentation for preservation of food

• Introduced sterilization techniques and developed steam sterilizer, hot air oven and autoclave

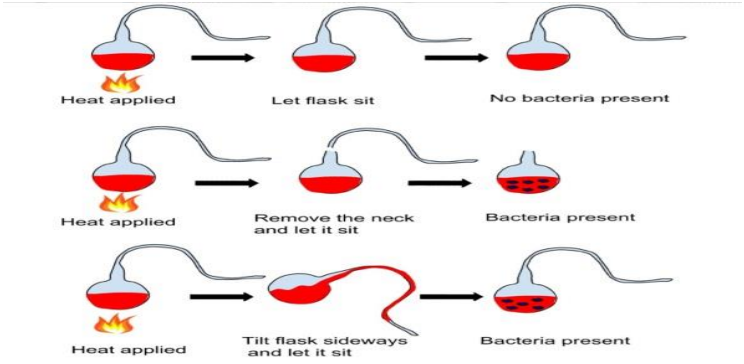


Fig 1.2

• Described method of pasteurisation of milk

• Contributed for vaccine development against several diseases such as anthrax, cholera and rabies

• Postulated “germ theory of disease”.

• Introduced liquid media concept

## KOCH’S POSTULATES

1. The microorganism should be constantly associated with the lesion.
2. It should be possible to isolate the organism in pure culture from the lesion of the disease.
3. The same disease must result when the isolated microorganism is inoculated into suitable laboratory animal.
4. It should be possible to re-isolate the organism in pure culture from the lesions produced in the experimental animals.
5. Antibody to the causative organism should be demonstrable in patient’s serumv

## KOCH’ S PHENOMENON

Robert Koch observed that guinea pigs already infected with tubercle bacillus developed a hypersensitivity reaction when injected with tubercle bacilli or its protein

Awarded Noble prize in the year 1902 for his contribution for development of life cycle of malarial parasite in mosquito

Ross developed mathematical models for the study of malaria epidemiology

Established the developmental stages of malaria parasites in anopheline mosquitoes; and they described the complete life cycles of *P. falciparum*, *P. vivax* and *P. malariae*

## Joseph Lister known as ‘Father of antiseptic surgery’

Observed that postoperative infections were greatly reduced by using disinfectants such as diluted carbolic acid during surgery to sterilize the instruments and to clean the wounds.

He instructed surgeons under his responsibility to wear clean gloves and wash their hands before and after operations with 5% carbolic acid solutions.

## ROBERT HOOKE (1635 – 1700)

Hooke was the first person to discover the cell (honey comb like structures) from the cross sections of a cork. He noticed some microscopic fungi too. He also developed simple microscopes of 30x magnification and observed few microorganisms.

## Robert Koch known as 'Father of Bacteriology'

## (1843-1901)

He got Nobel prize in year 1905 for the discovery of tubercle bacilli

Introduced solid media for culture of bacteria and use of agar

Methods of isolation of bacteria in pure culture

Described hanging drop method for motility of organism.

Discovered bacteria like anthrax, cholera and tubercle bacilli

Introduced staining techniques by using aniline dyes

Koch's postulates and Koch's phenomenon was given by him

## John Tyndall (1820-1893)

He designed a special chamber to free the dust in the air and kept the sterile broth in the chamber. No microbial growth was observed when a sterilized broth was kept in the chamber. Thus, he proved that dust in the air carried the germs and this is the source for the growth of microorganisms and not the spontaneous generation. He also developed a sterilization method called tyndallization. Tyndallization is otherwise called as the intermittent or fractional sterilization.

## ALEXANDER FLEMMING (1881-1955)

He was an English scientist worked at St. Mary's hospital in London. Flemming was associated with two major discoveries - lysozyme and penicillin. In 1922, he discovered lysozyme by demonstrating that the nasal secretion has the power of dissolving or lysing certain kinds of bacteria. Subsequently, he showed that lysozyme was present in many tissues of the body. In 1929, Flemming made an accidental discovery that the fungus Penicillium notatum produces an antibacterial substance which he called penicillin.

## Paul Ehrlich

Paul Ehrlich was a Nobel Prize-winning German physician and scientist who worked in the fields of hematology, immunology, and antimicrobial chemotherapy. Among his foremost achievements

were finding a cure for syphilis in 1909 and inventing the precursor technique to Gram staining bacteria

## ANTONY VAN LEEUWENHOEK (1632 – 1723)

Leeuwenhoek is a famous person who is always praised as the Father of Microbiology. He was a Dutch merchant and his hobby was making lenses and microscopes. His microscopes were simple microscopes composed of double convex glass lenses held between two silver plates that could magnify 50 to 300 times. He was the first to describe the protozoa and bacteria. He observed some bacteria from plagues of his own teeth. He named them as animalcules.

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