



Lecture 1. History of microbiology

Learning objectives

Upon completion of this lecture, student should be able to:

1. Define microbiology.
2. Understand the germ theory of disease.
3. List the known criteria of Koch (Koch's postulates).

The science of microbiology

Microbiology is the study of microorganisms including bacteria, viruses, fungi, and parasites of medical importance that are capable of causing diseases in humans.

Microbes may have either beneficial roles in maintaining life or undesirable roles in causing human, animal, and plant diseases.

Historical background

The first person to observe and describe microorganisms accurately was an amateur microscopist **Antony van Leeuwenhoek** (1632–1723).

Microbial diseases have played a major role in historical events, such as the decline of the Roman Empire and the conquest of the New World.

In 1347, plague or Black Death struck Europe with a brutal force. Over the next 80 years, the disease has struck repeatedly, eventually wiping out 75% of the European population.

Measles (now thankfully extinct) and smallpox too played their roles as epidemic diseases causing high mortality and morbidity.



Louis Pasteur: Father of microbiology

Louis Pasteur, French Microbiologist, is known as the father of medical microbiology for his immense contributions to the field of medical microbiology.

He first coined the term “microbiology” for the study of organisms of microscopic size.

Germ theory of disease

Germ theory, in medicine, as stated by **Louis Pasteur** (1822–1895) “certain diseases are caused by the invasion of the body by microorganisms, organisms too small to be seen except through a microscope”.

Pasteurization

It's a heat-treatment process that destroys pathogenic microorganisms in certain foods and beverages.

Vaccination

It is a simple, safe, and effective way of protection against harmful diseases, before coming into contact with them. It uses the body's natural defenses to build resistance to specific infections and making the immune system stronger.

In 1877, Pasteur developed a vaccine using a weakened strain of the anthrax bacillus, *Bacillus anthracis*.



Koch's postulates

Koch's postulates (criteria) by Robert Koch (German physician) were useful to prove the claim that a microorganism isolated from a disease was indeed causally related to it.

A microorganism was accepted as the causative agent of infectious disease, only when it satisfied all the following criteria:

1. The microorganism must be present in every case of the disease but absent from healthy host.
2. The suspected microorganism must be isolated and grown in a pure culture from lesions of the disease.
3. The isolated organism, in pure culture, when inoculated in suitable laboratory animals should produce a similar disease.
4. The same microorganism must be isolated again in pure culture from the lesions produced in experimental animals