FACULTY OF ENGINEERING &TECHNOLOGY
DEPARTMENT OF BIOTECHNOLOGY

The development of microbiology:

❖In the late 1800s and for the first decade of the 1900s, scientists seized the opportunity to further develop the germ theory of disease as enunciated by Pasteur and proved by Koch.

❖There emerged a **Golden Age of Microbiology** during which many agents of different infectious diseases were identified.

❖Many of the etiologic agents of microbial disease were discovered during that period, leading to the ability to halt epidemics by interrupting the spread of microorganisms.

Despite the advances in microbiology, it was rarely possible to render life-saving therapy to an infected patient.

Then, after World War II, the **antibiotics** were introduced to medicine.

The incidence of pneumonia, tuberculosis, meningitis, syphilis, and many other diseases declined with the use of antibiotics.

❖Work with viruses could not be effectively performed until instruments were developed to help scientists see these disease agents.

❖ In the 1940s, the **electron microscope** was developed and perfected.

❖In that decade, cultivation methods for viruses were also introduced, and the knowledge of viruses developed rapidly.

❖With the development of vaccines in the 1950s and 1960s, such viral diseases as polio, measles, mumps, and rubella came under control.

Modern microbiology:

Modern microbiology reaches into many fields of human endeavor, including the development of pharmaceutical products, the use of quality-control methods in food and dairy product production, the control of disease-causing microorganisms in consumable waters, and the industrial applications of microorganisms.

Microorganisms are used to produce vitamins, amino acids, enzymes, and growth supplements. They manufacture many foods, including fermented dairy products (sour cream, yogurt, and buttermilk), as well as other fermented foods such as pickles, sauerkraut, breads, and alcoholic beverages.

❖One of the major areas of applied microbiology is **biotechnology.**

❖In this discipline, microorganisms are used as living factories to produce pharmaceuticals that otherwise could not be manufactured.

❖ These substances include the human hormone insulin, the antiviral substance interferon, numerous blood-clotting factors and clotdissolving enzymes, and a number of vaccines.

❖Bacteria can be reengineered to increase plant resistance to insects and frost, and biotechnology will represent a major application of microorganisms in the next century.

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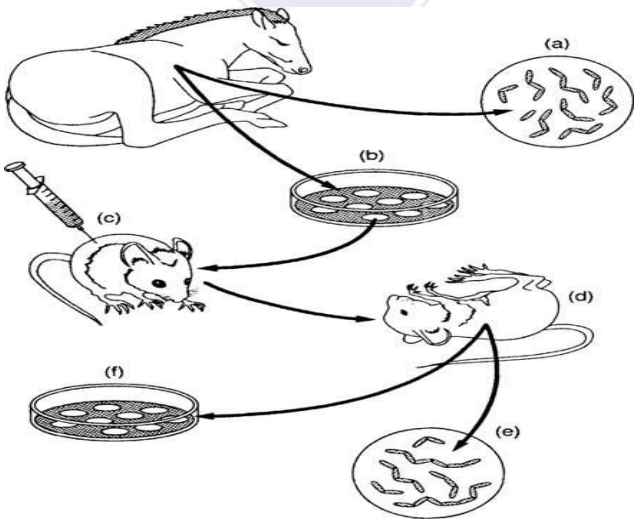

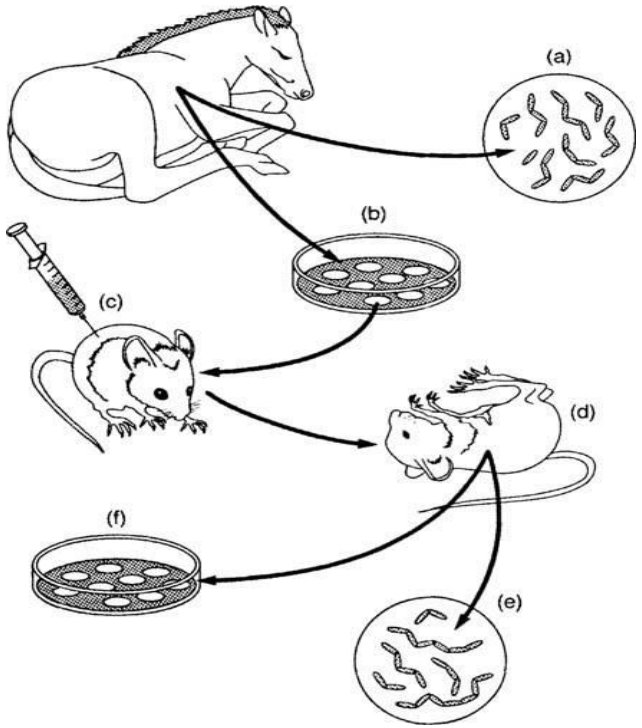

Figure 1 *The steps of Koch's postulates used to relate a specific microorganism to a specific disease. (a) Microorganisms are observed in a sick animal and (b) cultivated in the lab. (c) The organisms are injected into a healthy animal, and (d) the animal develops the disease. (e) The organisms are observed in the sick animal and (f) reisolated in the lab*.

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