History of Microbiology and Microbiologists

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Abstract

Microbiology as a science has been studying microscopic organisms for a long time. While initially it emphasized the main causes of infectious diseases, now it focuses more on practical applications. The paper seeks to explore the history of microbiology and significant contributions of the main physicians, naturalists, chemists, and microbiologists, who lived in different eras. Despite having discrepant views and assumptions about theories, they have greatly contributed to the development of the cell theory as well as the germ theory. Moreover, they conducted studies of various microorganisms by providing their precise and detailed description. The current essay focused on Robert Hooke, Anton van Leeuwenhoek, Francesco Redi, John Needham, Lazzaro Spallanzani, Louis Pasteur, and Robert Koch. Experiments conducted by the famous microbiologists and disputes about the spontaneous generation theory are also mentioned in the paper. History of microbiology is full of significant events, developments, and advancements that helped it achieve the highly technological state so that people can understand it better nowadays.

History of Microbiology and Microbiologists

As the study of microscopic organisms, microbiology has a rich and long history, primarily focusing on the main causes of various infectious diseases. However, nowadays it includes practical scientific applications. There have been important and vital contributions to the development of microbiology. Despite the fact that microbiology as the science emerged two hundred years ago, the scientists and microbiologists have recently discovered Mycobacterium tuberculosis in the Egyptian mummies aged 3000 years. Tortora, Funke, and Case (2010) point to the fact that various microorganisms have been around for a long time. Although, people do not know much about what human beings used to think about the treatment, transmission, and causes of diseases, the history of the last one hundred years is well-known nowadays. Several crucial developments in the field of microbiology help to reach the highly technological state so that the modern generation understands it deeper and better.

The early history of microbiology is full of key events. Not all the historians know who the first individuals that observed and explored microorganisms were. Microscope became available for the study during the 1600s, when the British scientist Robert Hooke made significant observations. He is famous for observing the strands of fungus among the specimens of cells that he examined. The cell theory is based on the fact that every living thing is composed of numerous cells (Tortora, Funke, & Case, 2010). In the 1670s and the consequent decades, the renowned Dutch tradesman Anton van Leeuwenhoek carefully observed various microscopic organisms and called them animalcules. The founder of scientific microscopy and naturalist revealed the microscopic world, and he is now regarded as one of the first scientists who provided precise and detailed description of bacteria, fungi, and protozoa.

After the Dutch merchant and designer of microscopes died, the microbiology studies did not evolve rapidly since a microscope was a rarity and the people's interest in diverse microorganisms was not so high. At that time, many scientists and scholars discussed the controversial theory of spontaneous generation that claimed that various microorganisms emerge from the insentient substance such as the beef broth (Alcamo & Warner, 2010). The Italian naturalist and physician Francesco Redi disputed this theory and demonstrated that maggots did not emerge from decaying meat as some might believe. Whilst the British priest and biologist John Needham promoted the spontaneous generation, the Italian physiologist Lazzaro Spallanzani challenged the theory by demonstrating that the boiled broth would not lead to the microscopic living forms.

Louis Pasteur, who worked in the 1800s, significantly contributed to the science of microbiology and received much of the credit for the development of the germ theory. The French chemist and biologist performed various experiments to reveal why dairy products and wine become sour after a while, and found out that bacteria affect this process directly. Pasteur drew attention to the significance of microorganisms in the daily life and led the scholars to believe that if bacteria could make wine or milk sour, then they could cause various human illnesses.

Pasteur refuted the theory of spontaneous generation and sustained his own theory. The biologist decided to conduct an experiment by filling a swan-necked flask with broth leaving it open to the air. However, a curve in the flack's neck helped microorganisms to fall directly into the neck, not the broth. As Pasteur predicted, the flask did not become contaminated, and his experiment rejected the idea of spontaneous generation. Moreover, the scientist's works encouraged the view that microorganisms could cause diseases even being in the air. The germ

theory of disease postulated by Louis Pasteur stated that microorganisms were the main causes of various infectious diseases. However, his attempt to prove this theory was not successful.

The famous German scientist Robert Koch could prove the germ theory by growing anthrax bacteria apart from other organisms. He injected pure culture of bacilli into mouse and demonstrated that bacilli caused anthrax permanently. The procedures that the microbiologist used are well-known today as the Koch's postulates (Tortora, Funke, & Case, 2010). They constitute a set of various principles whereby one may relate some microorganisms to other infectious diseases.

The late 1800s and the early 1900s were characterized by the development of microbiology. In this period, scholars tried to promote the development of the germ theory of disease as proved by Koch and proclaimed by Pasteur (Alcamo & Warner, 2010). The golden age of microbiology emerged, during which numerous agents of various infectious diseases were identified. During that period, the scientists discovered etiologic agents of microbial diseases, resulting in the ability to cease epidemics by interrupting the spread of multiple microorganisms.

Despite the microbiological advances, the physicians could rarely provide life-saving treatment to the infected patients. After the Second World War, the antibiotics were introduced. The use of antibiotics helped diminish various diseases including syphilis, meningitis, tuberculosis, and pneumonia. Work with numerous viruses could not be successfully executed until the important tools were designed to help scholars and physicians see these germs. In the 1940s, the scientists developed and improved the electron microscope. They also introduced various cultivation methods for viruses, rapidly developing the knowledge of them. Rogers (2011) pointed to the fact that the development of vaccines in the fifties and sixties helped to control serious viral diseases, namely rubella, mumps, measles and polio.

Biotechnology is the main area of applied microbiology. The discipline is characterized by using living factories to manufacture pharmaceuticals that cannot be produced otherwise, including the antiviral interferon, various vaccines, blood-clotting factors, and insulin. Through biotechnology, the main application of microorganisms will be presented in the near future.

Microbiology studies the microscopic life on Earth. Nowadays, it offers multiple applications in such disciplines as food and environmental science, health care, and medicine. Numerous fields of applied microbiology are based on the microbiologists' knowledge. Microbiology contributes to countless practical applications, including medicinal and food ones that constitute a large portion of the applied microbiology. The studies of microbes have led to the establishment of commercial industries that affect significant aspects of human life.

References

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