

Microbiology and its Importance

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Microbiology is the study of microorganisms which includes a diverse group of simple life forms that includes bacteria (archaeobacteria and eubacteria), algae, fungi, protozoa, viruses and prions etc. Microbiology is a broad term which includes virology, mycology, parasitology, bacteriology, immunology and other related branches. This field is concerned with the fundamental research on evolution, cell biology, physiology and biochemistry, clinical aspects, ecology and with ways of both exploiting as well as controlling their activities. We are living in the age of Bacteria, they being the first living organisms on our planet. They are found virtually everywhere life is possible and are more numerous than any other kind of organism. They probably constitute the largest component of the earth's biomass.

Daily life is inextricably interwoven with microbes and they affect every aspect of our lives being omnipresent (they are in us, on us and around us). They are important to all the vital activities and processes that occur on and around the earth. Microbes are very versatile in nature and keep on working round the clock every single second. They work selflessly and play key role in biodegradation/biodeterioration/bioremediation, nutrient cycling, climate change, food spoilage, the cause and also control of disease etc. Sometimes some of their activities creates problem to the humans and it is for us to understand how to look on the positive aspect of that problem and make that useful for us. They can be made to work in many ways like cleaning the environment and reducing the pollution, biofuel production, in making of life saving medicines, fermentations, production and processing of food etc. In the future microorganisms themselves may become a more important nutrient source for livestock and humans. Microorganisms are thus of incalculable value to Earth.

Microbiology also has its inputs in various other areas thereby contributing to human welfare and it is concerned with the impact of microorganisms on agriculture. Work is on faster pace to reduce/control the attack of microbes on plants and food crops resulting in huge losses. Currently, there is great interest in using microbes as substitutes for chemical pesticides, to increase soil fertility and crop yields and study the role of microorganisms living in the digestive tracts of ruminants.

Modern biotechnology indeed, rests upon a microbiological foundation. Microbial genetics and molecular biology focus on the nature of genetic information and how it regulates the development and function of cells and organisms. The use of microorganisms has been very helpful in understanding gene function. It leads to development of new microbial strains that are more efficient in synthesizing useful products. Genetic techniques are used to insert new genes into plants and animals which may for example give grains like wheat nitrogen fixation genes thereby eliminating the need of nitrogen fertilizers. Genetically Engineered microorganisms are used to make antibiotics, vaccines, hormones and various other products.

Microbiology research will continue to be central to most of the current global challenges like provision of security for food, water and energy for a healthy population on our habitable earth. Microbiology is one of the most rewarding professions as it links with all the other natural sciences and thereby contributes to the betterment of human life in various ways.

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