Journal of Clinical & Experimental Pathology

White, J Clin Exp Pathol 2021, 11:S13

Commentary Open Access

Microbiology and its Applications

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Received date: October 08, 2021; **Accepted date:** October 22, 2021; **Published date:** October 29, 2021

Citation: White B (2021) Microbiology and its Applications. J Clin Exp Pathol S13: 003.

Description

The study of microorganisms is microbiology that they are unicellular, multicellular (colony of cells) or cellular (with missing cells). Microbiology encompasses numerous sub-disciplines, consisting of virology, bacteriology, protistology, mycology, immunology, and parasitology. Eukaryotic microorganisms have membrane-bound organelles and include fungi and protists, while prokaryotic organisms, all of which are microorganisms, are conventionally classified as having no membrane-bound organelles and include bacteria and archaea. The seven types of the microorganisms are bacteria, archaea, protozoa, algae, fungi, viruses, and multicellular animal parasites. Microbiology involves many fields like parasitology, mycology, bacteriology, virology, protozoology, phycology and branches like pure and applied microbiology. Microbiologists are relied on culture, staining, and microscopy. Less than 1% of the microorganisms are present in the common environments can be cultured in isolation. Microbiologists rely on molecular biology tools such as DNA sequence-based identification. Viruses were classified differently as organisms because they were thought to be very simple microorganisms or very complex molecules. Virologists have studied the prions that were never considered microorganisms because the clinical effects attributed to them were originally due to the chronic viral infections, and virologists looked for infectious proteins. The existence of microorganisms was predicted many centuries ago.

Applications of Microbiology

While some of the microbes fear the association of some microbes with the various human diseases, many microbes are also responsible for the numerous useful processes like the industrial fermentation, the manufacture of antibiotics and act as molecular vehicles for the transferring DNA to complex organisms such as plants and animals. The scientists have also used their knowledge of microbes to produce biotechnologically important enzymes such as Taq polymerase, reporter genes for use in other genetic systems and new molecular biology techniques such as the yeast two-hybrid system. Bacteria can be used for the industrial production of the amino acids. The *Corynebacterium glutamicum* is one of the most important types of bacteria with an annual production of more than two million tons of amino acids, mainly L-glutamate and lysine. Because some of the bacteria have the ability to synthesize antibiotics, they are used medicinally. Microorganisms produce a variety of biopolymers such as polysaccharides, polyesters, and polyamides. They are used for the biotechnological production of biopolymers with tailor-made properties suitable for high-quality medical applications such as tissue engineering and drug delivery. The microorganisms are also used for the biosynthesis of xanthan, alginate, cellulose, cyanophycin, poly (gamma-glutamic acid), levan, hyaluronic acid, organic acids, oligosaccharides, polysaccharides and poly hydroxyl alkanoates.

Microorganisms are useful for the microbial biodegradation or remediation of household, agricultural and industrial wastes and underground contamination in soils, sediments and the marine environment. The ability of a microorganism to break down toxic waste depends on the nature of the individual contaminants. Because sites often have multiple types of contaminants, the most effective approach to microbial biodegradation is to use a mixture of bacterial and fungal species and strains, each specific to biodegrade one or more types of contaminants. Symbiotic microbial communities provide health benefits for their human and animal hosts, including aiding digestion, the production of helpful vitamins and amino acids, and the suppression of pathogenic microbes. Some benefit can be gained from consuming fermented foods, probiotics (bacteria that can help the digestive system), or prebiotics (substances that promote the growth of probiotic microorganisms). The effects of the micro biome on human and animal health and methods for influencing the micro biome are active areas of research. Some of the research has shown that microorganisms could be helpful in treating cancer. Several nonpathogenic clostridial strains can infiltrate and replicate in solid tumors. Clostridial vectors can be safely administered and their potential to deliver therapeutic proteins has been demonstrated in a variety of preclinical models. Some bacteria are used to study basic mechanisms.