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Editorial

Microbial Solutions for Microbial Caused Problems

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Editorial

For a living being, both the aspects are there, the beneficial as well as the harmful effects on environment, on its living surroundings and on other associated living beings. In spite of beneficial, there are several pathogenic microorganisms (bacteria, fungi, viruses, protozoa and others), which are responsible for deadly diseases for example AIDS, diarrhea, tuberculosis, measles, immonocompromised diseases and many more. One more major threat is, trends of microorganisms, becoming resistant towards available drugs is a concern of mortallity and morbidity.

Based on World Health Organization (WHO) and according to the Foundation for AIDS Research (FAR), almost 39 million people have died due to HIV/AIDS. In 2013, about 1.5 million people lost their lives to AIDS. That's about 2.7 percent of deaths worldwide. By the end of 2012, 35.3 million people around the world were infected with HIV. Every day, about 5,700 more become infected [1].

Intestinal infection is the major cause of deadly diarrhea generally transmitted by bacteria, viruses or some parasites. Contaminated water or food is mainly responsible for the concerned infection but improper sanitation and hygiene also play important role [1]. Around 315,000 children under the age of five die every year from diarrheal diseases due to the infection caused by dirty water and poor sanitation. Around 900 children per day or in other words one child every two minutes die due to diarrheal disease. This is particularly widespread in developing nations that have poor sanitary conditions (WHO/UNICEF 2014, 2015).

Tuberculosis (TB) is an airborne and a lung related disease and caused by bacteria called Mycobacterium tuberculosis. It is considered that TB is often successfully treated but some strains of TB are resistant to conventional treatments. Second-line drugs used to treat these patients are in limited supply. Some strains fail to respond to second-line treatment as well [2]. According to WHO estimation about 900,000 people lost their lives to TB in 2012 and till date the exact treatment or the drug resistance problem of this disease is a challenge for medical science. The majority of TB-related deaths are also happen in poorer or developing countries. It is one of the known top causes of death for people who have HIV. These all life threatning diseases are linked directly or indirectly by microbes either bacteria, fungi, viruses, protozoa and others. Everyday new drugs are reseached, searched or produced but we are not reaching on the exact or right targets or these drugs has its own abnormalities [1].

Based on some previous research it is considered that the microbial solutions for the microbial problems are one of the best possible solutions to these emerging problems. The antimicrobial metabolites, organic compounds, peptides naturally produced from extremophilicorganisms can invade these pathogenic or Multi Drug Resistance (MDR) problems [3- 5]. These compounds vary in spectrum and mode of activity, molecular structure and molecular mass, thermo stability, pH range of activity, and genetic determinants [6-14].

Psychrophilic microorganisms are widely prevalent on earth, as there is a vast area where temperatures constantly remain below 10°C, such as in deep-sea waters, mountains and Polar regions. The constraints on and sustainability of life in frozen environments are of consider able importance in a number of contexts, from polar microbial ecology and astrobiology to cryopreservation and other industrial applications [15,16]. Psychrophilic bacterial strains, and particularly their enzymes, that are able to perform catalysis efficiently at low temperatures have been proposed for use in a number of biotechnology applications [17,18]. In view of the severe environmental conditions prevailing in Antarctica and the Arctic, it has been argued that the production of extracellular antimicrobial compounds would be a particular advantage in reducing interspecies competition [19]. The producer strains amongst the microorganisms in those microhabitats exhibit antimicrobial prowess to maintain community structure of the ecological niches [19].

An enzyme from the thermo philic archaeon Sulfolobussolfataricus MT4 can use the bicyclic synthon (rac)-γ-lactam (2-azabicyclo[2.2.1]hept-5-en-3-one) as a substrate to obtain a single

enantiomer of the γ-bicyclic lactam product which is an important building block for the anti-HIV compound, Abacavir [20].

Natural product drug discovery from untapped sources of microorganisms, such as the oceans, is full of innovative solutions and is again becoming increasingly explored by the pharmaceutical industry. In fact, interesting bioactivities such as anti-tumour, anti-microtubule and anti-proliferative have been successfully identified in the marine environment. Antibiotic properties of marine products, in particular, have been shown to be effective against several microbial infections and should be further explored for the treatment of infectious diseases such as Tuberculosis, which have become a great threat to global health [21]. Therefore, it was suggested that Polar Regions and other extremophilic may be viewed as a vast untapped reservoir of microorganisms with manifold antibiotic and other drug potential [19,22].

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