

# Institute of Aerospace Medicine

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### **Arctic extremophiles from thawing permafrost and their biotechnological and ecological implications**

Microorganisms that exist in cold environments are well adapted to various fluctuating stressful conditions. For example bacteria living in Arctic polar environments have to tolerate extreme conditions such as low temperature, low nutrient availability, and high UV radiation. The presentation will be focused on the two different aspects of polar microbiology such as biotechnological and also potential risks of Arctic bacteria. Firstly, the bacteria were isolated from the Arctic glaciers and permafrost, able to synthesize various forms of intracellular and extracellular biopolymer with excellent biotechnological potentials. It has been strongly believed that the biopolymer synthesis is one of the survival mechanisms of the bacteria to live in stressful and unstable environments. The biopolymer synthesis also have significant role in ecological succession of psychophilic and psychrotrophic bacteria in Arctic environment. Secondly, the isolation of permafrost bacteria and studies on permafrost microbes has increased recently. The researchers who handle and study the unknown microbes, however, should be concerned about the pathogenicity of bacteria exposed from permafrost because some strains may cause unpredictable infectious diseases. Therefore, we have developed an overall lipid A validation process provides a general strategy for characterizing bacteria that have been isolated from arctic permafrost and analyzing their respective pathogenicity's.