Contribution ID: **261** Type: **Oral**

# Tutorial 1: Metagenomics: The key to new biology for basic protein research and application

*Monday, 15 May 2023 09:15 (1 hour)*

Metagenomics is a technique that enables us to look at parts of the biosphere that were masked to us. With present estimates suggesting that ~98% of the microorganisms are not amenable to growth under lab conditions, metagenomics is helping us to understand the role of microorganisms in different environments.

Two metagenomic discoveries of light harvesting by microorganisms will be discussed. The first is the finding of light-driven rhodopsin proton pumps in marine microorganisms. These rhodopsins are now believed to be present in 70% of marine bacteria and archaea in the photic zone. The second is the discovery of cyanophages (viruses infecting cyanobacteria) that carry in their genomes photosynthetic genes coding for both photosystem-I and II proteins. It was suggested that the horizontal transfer of these genes might be involved in increasing viral fitness.

Furthermore, the discoveries of strange rhodopsins, the bestrhodopsin ion-channel complexes and the potassium channelrhodopsins, to be used as potential tools for optogenetics, will also be described.

The implications of metagenomics on basic and applied science as a whole will be elaborated.

## Select Topic 1

Novel Biology

## Select Topic 2

**Primary author:** BEJA, Oded (The Louis and Lyra Richmond Chair in Life Sciences, Faculty of Biology, Technion - Israel Institute of Technology, Haifa 3200003, Israel)

**Presenter:** BEJA, Oded (The Louis and Lyra Richmond Chair in Life Sciences, Faculty of Biology, Technion - Israel Institute of Technology, Haifa 3200003, Israel)

**Session Classification:** Novel Biology