

Seminar Invitation

Metagenomics-guided discovery of new microbial biotransformations

Speaker **Dr Serina L. Robinson, Group Leader 'Microbial Specialized Metabolism', Department of Environmental Microbiology, Eawag**

When **October 19, 2021, 16.00 – 17.00**

Where **Online via Zoom, contact admin.umik@eawag.ch for access details**

Abstract Microbes encode a remarkable diversity of enzymes to produce and break down bioactive compounds in the environment. The majority of microbial enzymes have been characterized from bacteria cultivated in the laboratory, yet it is estimated that <1% of total microbial diversity has been isolated to date. Through surveys of the environment using 'omics techniques, it is clear we have only characterized a small fraction of the biochemical diversity of the uncultivated majority of microorganisms. In this talk, we describe our research on the functional characterization of enzymes from uncultivated microbes by heterologously producing metagenomic enzymes and assaying their activity using mass spectrometry. Using a wastewater denitrifier, *Microvirgula aerodenitrificans*, as a non-standard heterologous host, we characterized four biosynthetic metagenomic enzymes which install up to 21 post-translational modifications in bioactive peptides produced by environmental bacteria belonging to the uncultivated phylum 'Candidatus Eremiobacterota.' Unexpectedly, we discovered the first example of peptide backbone *N*-methylation in bacteria catalyzed by an enzyme in the FkbM-like *O*-methyltransferase family. As an outlook, we describe how these functional metagenomic strategies can be applied to investigate the enzymology of uncultivated microbes from other natural and engineered aquatic systems.