

SESSION: Ecosystems, Biodiversity and Biodiscovery**MARS Themes:**

Development of capacity in biodiscovery & biotechnology

Title:

Disentangling the biosynthetic potential of the Southern Ocean microbiome

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Abstract:

Microbial natural products play an important role in biotechnology, as evidenced by their roles in various industries. In recent years, the discovery of new natural products has been increased by the availability of large amounts of sequencing data. Sequencing technologies have opened new opportunities to discover the hidden biosynthetic potential of the world's microorganisms, including those from previously uncultured bacteria from extreme environments. Microbial pigments have received significant attention for their uses in industry. They are ubiquitous and are commonly found in high stress environments. Epipelagic sunlit waters in tropical oceans have been identified as having a high diversity of terpenes, which may contain genes that code for production of microbial pigments known as carotenoids. Novel biosynthetic gene clusters have been identified using bioinformatics tools such as antiSMASH. This method uses a rule-based approach to predict biosynthetic gene clusters in genomes. Machine learning methods such as DeepBGC aim to make BGC prediction in microbial genomes more generalisable, thereby increasing the discovery of novel NPs. This machine learning approach predicts biosynthetic gene clusters through pattern recognition in conserved amino acid sequences. Synthetic biology can be used to construct these genes for expression in heterologous hosts. Expression of these gene clusters may lead to discovery of novel natural products for applications in biotechnology.

Format:

5-min oral

Keywords:

Microbial diversity; Southern Ocean; Secondary metabolites; Biosynthetic genes