

Nonribosomal peptides from cyanobacteria

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Cyanobacteria are a diverse and unique photoautotrophic group of prokaryotic microorganisms, thriving in various habitats, such as in aquatic ecosystems, soils and air, and can cope successfully with extreme conditions typical for example in hot springs and polar frosty environments. Most of the cyanobacterial species can produce a wide variety of secondary metabolites with diverse biological activities. The unique cyanobacterium-specific secondary metabolites originated from variable biosynthetic pathways have a great chemical diversity and are widespread across cyanobacterial taxa. Many of these compounds have been isolated and partly or fully characterized from strains cultured under controlled conditions and from field samples, respectively. The discovery of cyanobacterial natural products has been focusing mainly on their potential pharmacological applications, toxic effects on human and animal health, the physiological roles in the producers or their potentials to serve as allelochemicals. A major family of cyanobacterial secondary metabolites are the oligopeptides synthesized by non-ribosomal pathways, a highly diverse group of low molecular weight peptides built from proteinogenic and non-proteinogenic amino acids. By the most widely accepted classification seven major peptide classes are the follows: aeruginosins, cyanopeptolins, anabaenopeptins, microginins, microviridins, cyclamides, and the well-studied and notorious microcystins. The aim of this presentation to provide a complete overview of the diversity, distribution and the possible application of these secondary metabolites.