

174d - Biochemical Characterization of the Flavin-Dependent Monooxygenase Required for the Biosynthesis of the Nocardiosis-Associated Glycolipid



Monday, October 28, 2024



3:30 PM - 5:00 PM



Exhibit Hall GH (Ground Level, San Diego Convention Center)

Abstract

A subset of *Nocardia spp.* harbor a highly conserved biosynthetic gene cluster designated as the NOCardiosis-Associated Polyketide (NOCAP) synthase that produces a unique glycolipid natural product. The NOCAP glycolipid is composed of a fully substituted benzaldehyde headgroup linked to a polyfunctional alkyl tail and an O-linked disaccharide composed of 3- α -epimycarose and 2-O-methyl- α -rhamnose. Incorporation of the disaccharide unit is preceded by a critical step involving flavin monooxygenase promoted hydroxylation by NocapM. In this study, we employed biochemical, spectroscopic, and kinetic analyses to explore the substrate scope and biocatalytic potential of NocapM. Our findings indicate that NocapM catalyzes the hydroxylation of diverse chemical substrates, such as benzaldehydes, acetophenones, methyl benzoates, and 1,3-benzodioxole derivatives. Our in-depth biochemical characterization of NocapM provides a solid foundation for future biocatalytic efforts and biosynthetic pathway engineering.

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