Food-poisoning bacteria employ a citrate synthase and a type II NRPS to synthesize bolaamphiphilic lipopeptide antibiotics.

Dose B, Ross C, Niehs SP, Scherlach K, Bauer JP, Hertweck C (2020) Food-poisoning bacteria employ a citrate synthase and a type II NRPS to synthesize bolaamphiphilic lipopeptide antibiotics. *Angew Chem Int Ed* 59(48), 21535-21540.

Details

Abstract

Mining the genome of the food-spoiling bacterium Burkholderia gladioli pv. cocovenenans revealed five non-ribosomal peptide synthetase (NRPS) gene clusters, including an orphan gene locus (bol). Gene inactivation and metabolic profiling linked the bol gene cluster to novel bolaamphiphilic lipopeptides with antimycobacterial activity. A combination of chemical analyses and bioinformatics elucidated the structures of bolagladin A and B, lipocyclopeptides featuring an unusual dehydro-β-alanine enamide linker fused to an unprecedented tricarboxylic fatty acid tail. Through a series of targeted gene deletions we proved the involvement of a designated citrate synthase (CS), priming ketosynthases (KS III), a type II NRPS including a novel desaturase for enamide formation, and a multimodular NRPS generating the cyclopeptide. Network analyses

revealed the evolutionary origin of the CS and identified cryptic CS/NRPS gene loci in various bacterial genomes.

Beteiligte Forschungseinheiten

Biomolekulare Chemie Christian Hertweck Mehr erfahren

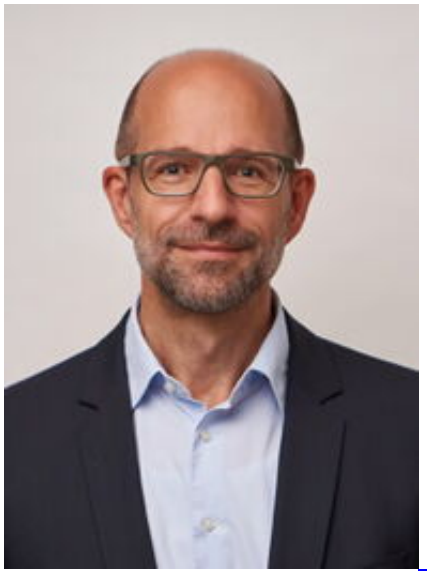
Leibniz-HKI-Autor*innen

Johanna Pauline Bauer

Details

Benjamin Dose

Details



Christian Hertweck

Details

Sarah Niehs

Details

Claudia Roß

Details

Kirstin Scherlach

Details

Identifier

doi: 10.1002/anie.202009107

PMID: 32780428