Genomics-driven discovery of a symbiont-specific cyclopeptide from bacteria residing in the rice seedling blight fungus.

Niehs SP, Dose B, Scherlach K, Roth M, Hertweck C (2018) Genomics-driven discovery of a symbiont-specific cyclopeptide from bacteria residing in the rice seedling blight fungus. *ChemBioChem* 19(20), 2167-2172.

Details

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Abstract

The rice seedling blight fungus Rhizopus microsporus harbors endosymbiotic bacteria (Burkholderia rhizoxinica) that produce the virulence factor rhizoxin and control host development. Genome mining indicated a massive inventory of cryptic non-ribosomal peptide synthetase (NRPS) genes, which have not yet been linked to any natural products. We report the discovery and full characterization of a novel cyclopeptide from endofungal bacteria. In silico analysis of an orphan, symbiont-specific NRPS predicted the structure of a nonribosomal peptide, which was targeted by LC-MS/MS profiling of wild type and engineered null mutants. NMR and chemical derivatization elucidated the structure of the bacterial cyclopeptide. Phylogenies revealed the relationship starter C domains for rare N-acetyl capped peptides. Heptarhizin is produced under symbiotic conditions in geographically constrained strains from the Pacific clade, indicating a potential ecological role of the peptide.

Involved units

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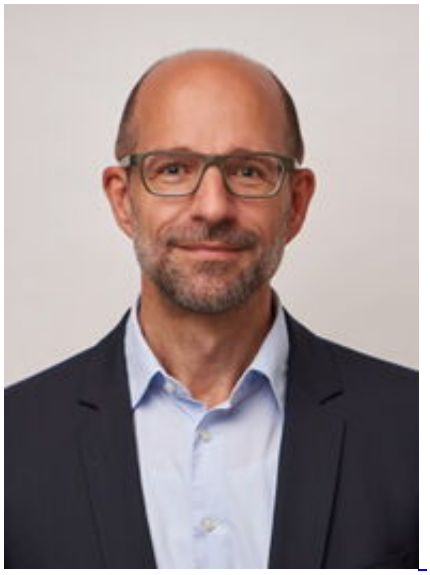
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