Two types of threonine-tagged lipopeptides synergize in host colonization by pathogenic *Burkholderia* species.

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Abstract

Bacterial infections of agriculturally important plants and mushrooms pose a major threat to human food sources worldwide. However, structures of chemical mediators required by the pathogen for host colonization and infection remain elusive in most cases. Here, we report two types of threonine-tagged lipopeptides conserved among mushroom and rice pathogenic Burkholderia species that facilitate bacterial infection of hosts. Genome mining, metabolic profiling of infected mushrooms and heterologous expression of orphan gene clusters allowed the discovery of these unprecedented metabolites in the mushroom pathogen Burkholderia gladioli (haereogladin, burriogladin), and the plant pathogen Burkholderia glumae (haereoglumin, and burrioglumin). Through targeted gene deletions the molecular basis of lipopeptide biosynthesis by non-ribosomal peptide synthetases was revealed. Surprisingly, both types of lipopeptides feature unusual threonine tags, which yield longer peptide backbones than one would expect based on the canonical co-linearity of the NRPS assembly lines. Both peptides play an indirect role in host

infection as biosurfactants that enable host colonization by mediating swarming and biofilm formation abilities. Moreover, MALDI imaging mass spectrometry was applied to investigate the biological role of the lipopeptides. Our results shed light on conserved mechanisms that plant and mushroom pathogenic bacteria utilize for host infection and expand current knowledge on bacterial virulence factors that may represent a new starting point for the targeted development of crop protection measures in the future.

Beteiligte Forschungseinheiten

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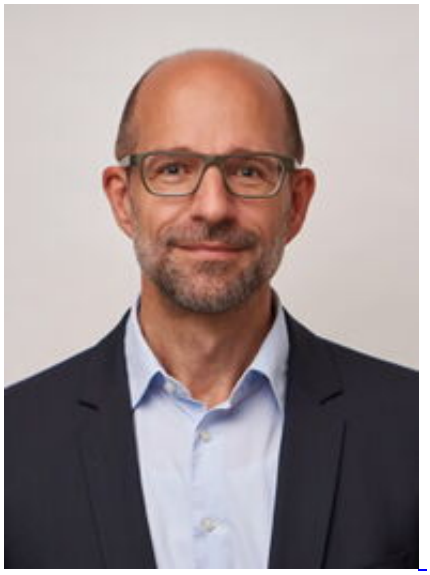
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