Induced chemical defense of a mushroom by a double-bond-shifting polyene synthase.

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Abstract

The antilarval mushroom polyenes 18-methyl-19-oxoicosaoctaenoic acid and 20-methyl-21-oxodocosanonaenoic acid appear in response to injury of the mycelium of the stereaceous mushroom BY1. We identified a polyketide synthase (PPS1) which belongs to a hitherto completely uncharacterized clade of polyketide synthases. Expression of the PPS1 gene is massively upregulated following mycelial damage. The synthesis of the above polyenes was reconstituted in the mold Aspergillus niger as a heterologous host. This demonstrates that PPS1 1) synchronously produces branched-chain polyketides of varied lengths, and 2) catalyzes the unprecedented shift of eight or nine double bonds. This study represents the first characterization of a reducing polyketide synthase from a mushroom. We also show that injury-induced de novo synthesis of polyketides is a fungal response strategy.

Beteiligte Forschungseinheiten

Biomolekulare Chemie Christian Hertweck Mehr erfahren

Sekundärmetabolismus räuberischer Bakterien Mehr erfahren

Pharmazeutische Mikrobiologie Dirk Hoffmeister Mehr erfahren

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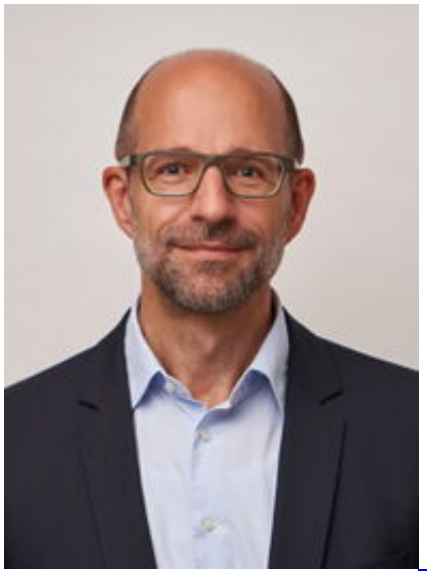
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