Cryptic polyketide synthase genes in non-pathogenic *Clostridium* SPP.

Behnken S, Hertweck C (2012) Cryptic polyketide synthase genes in non-pathogenic *Clostridium* SPP. *PLoS One* 7(1), e29609. PubMed

ILRS Authors

Swantje Behnken

Projects

Genome mining of Gram-positive bacteria for secondary metabolites
Details

Abstract

Modular type I polyketide synthases (PKS) produce a vast array of bacterial metabolites with highly diverse biological functions. Notably, all known polyketides were isolated from aerobic bacteria, and yet no example has been reported for strict anaerobes. In this study we explored the diversity and distribution of PKS genes in the genus *Clostridium*. In addition to comparative genomic analyses combined with predictions of modular type I polyketide synthase (PKS) gene clusters in sequenced genomes of Clostridium spp., a representative selection of other species inhabiting a variety of ecological niches was investigated by PCR screening for PKS genes. Our data reveal that all studied pathogenic *Clostridium* spp. are devoid of putative PKS genes. In stark contrast, cryptic PKS genes are widespread in genomes of non-pathogenic *Clostridium* species. According to phylogenetic analyses, the Clostridium PKS genes have unusual and diverse origins. However, reverse transcription quantitative PCR demonstrates that these genes are silent under standard cultivation conditions, explaining why the related metabolites have been overlooked until now. This study presents clostridia as a putative source for novel bioactive polyketides.

Identifier

doi: 10.1371/journal.pone.0029609 PMID: 22235310