Symbiont-Derived Antimicrobials Contribute to the Control of the Lepidopteran Gut Microbiota.

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Abstract

Insects develop efficient antimicrobial strategies to flourish in a bacterial world. It has long been proposed that native gut microbiota is an important component of host defense; however, the responsible species have rarely been isolated to elucidate the mechanism of action. Here we show that the dominant symbiotic bacterium Enterococcus mundtii associated with the generalist herbivore Spodoptera littoralis actively secretes a stable class IIa bacteriocin (mundticin KS) against invading bacteria, but not against other gut residents, facilitating the normal development of host gut microbiota. A mundticin-defective strain lost inhibitory activity. Furthermore, purified mundticin cures infected larvae. Thus, the constitutively produced antimicrobials by native extracellular symbionts create a significant chemical barrier inside limiting invader expansion. This unique property also benefits E. mundtii itself by providing a competitive advantage, contributing to its dominance within complex microbial settings and its prevalence across Lepidoptera, and probably promotes the long-term cooperative symbiosis between both parties.

Beteiligte Forschungseinheiten

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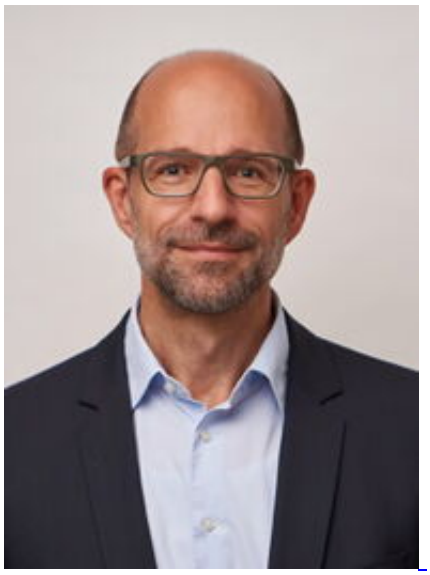

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