A polyketide interferes with cellular differentiation in the symbiotic cyanobacterium *Nostoc punctiforme*.

Liaimer A, Jenke-Kodama H, Ishida K, Hinrichs K, Stangeland J, Hertweck C, Dittmann E (2011) A polyketide interferes with cellular differentiation in the symbiotic cyanobacterium *Nostoc punctiforme*. *Environ Microbiol Rep* 3(5), 550-558.

Abstract

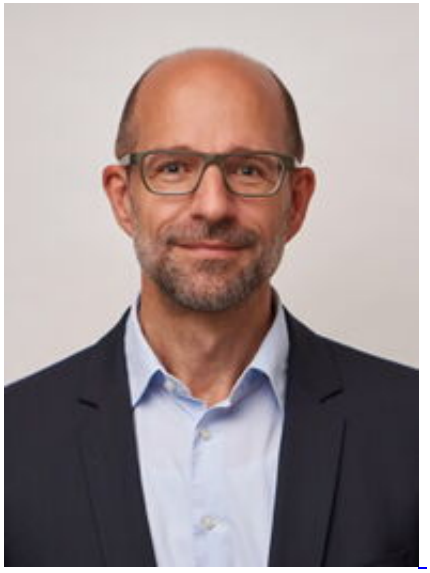
Nostoc punctiforme is a filamentous cyanobacterium capable of forming symbiotic associations with a wide range of plants. The strain exhibits extensive phenotypic characteristics and can differentiate three mutually exclusive cell types: nitrogen-fixing heterocysts, motile hormogonia and spore-like akinetes. Here, we provide evidence for a crucial role of an extracellular metabolite in balancing cellular differentiation. Insertional mutagenesis of a gene of the polyketide synthase gene cluster pks2 led to the accumulation of short filaments carrying mostly terminal heterocysts under diazotrophic conditions. The mutant has a strong tendency to form biofilms on solid surfaces as well as in liquid culture. The pks2(-) strain keeps forming hormogonia over the entire growth curve and shows an early onset of akinete formation. We could isolate two fractions of the wild-type supernatant that could restore the capability to form long filaments with intercalary heterocysts. Growth of the mutant cells in the neighbourhood of wild-type cells on plates led to a reciprocal influence and a partial reconstruction of wild-type and mutant phenotype respectively. We postulate that extracellular metabolites of Nostoc punctiforme act as life cycle governing

factors (LCGFs) and that the ratio between distinct factors may guide the differentiation into different life stages.

Beteiligte Forschungseinheiten

Biomolekulare Chemie Christian Hertweck Mehr erfahren

Leibniz-HKI-Autor*innen



Christian Hertweck

Details

Keishi Ishida

Details

Identifier

doi: 10.1111/j.1758-2229.2011.00258.x

PMID: 23761334