HapX Mediates Iron Homeostasis in the Pathogenic Dermatophyte *Arthroderma benhamiae* but Is Dispensable for Virulence.

Kröber A, Scherlach K, Hortschansky P, Shelest E, Staib P, Kniemeyer O, Brakhage AA (2016) HapX Mediates Iron Homeostasis in the Pathogenic Dermatophyte *Arthroderma benhamiae* but Is Dispensable for Virulence. *PLOS ONE* 11(3), e0150701.

Abstract

For many pathogenic fungi, siderophore-mediated iron acquisition is essential for virulence. The process of siderophore production and further mechanisms to adapt to iron limitation are strictly controlled in fungi to maintain iron homeostasis. Here we demonstrate that the human pathogenic dermatophyte *Arthroderma benhamiae* produces the hydroxamate siderophores ferricrocin and ferrichrome C. Additionally, we show that the iron regulator HapX is crucial for the adaptation to iron starvation and iron excess, but is dispensable for virulence of *A. benhamiae*. Deletion of hapX caused downregulation of siderophore biosynthesis genes leading to a decreased production of siderophores during iron starvation. Furthermore, HapX was required for transcriptional repression of genes involved in iron-dependent pathways during iron-depleted conditions. Additionally, the ΔhapX mutant of *A. benhamiae* was sensitive to high-iron concentrations indicating that HapX also contributes to iron detoxification. In contrast to other pathogenic fungi, HapX of A. benhamiae was redundant for virulence and a ΔhapX mutant was still able to infect keratinized host tissues in

vitro. Our findings underline the highly conserved role of the transcription factor HapX for maintaining iron homeostasis in ascomycetous fungi but, unlike in many other human and plant pathogenic fungi, HapX of *A. benhamiae* is not a virulence determinant.

Beteiligte Forschungseinheiten

Biomolekulare Chemie Christian Hertweck Mehr erfahren

Molekulare und Angewandte Mikrobiologie Axel Brakhage Mehr erfahren

Microbiome Dynamics Gianni Panagiotou Mehr erfahren

Leibniz-HKI-Autor*innen

Axel A. Brakhage

Details

Peter Hortschansky

Details

Olaf Kniemeyer

Details

Antje Kröber

Details

Kirstin Scherlach

Details

Ekaterina Shelest

Details

Identifier

doi: 10.1371/journal.pone.0150701

PMID: 26960149