Protein kinase A regulates growth, sporulation, and pigment formation in *Aspergillus fumigatus*.

Grosse C, Heinekamp T, Kniemeyer O, Gehrke A, Brakhage AA (2008) Protein kinase A regulates growth, sporulation, and pigment formation in *Aspergillus fumigatus*. *Appl Environ Microbiol* 74(15), 4923-4933.

Abstract

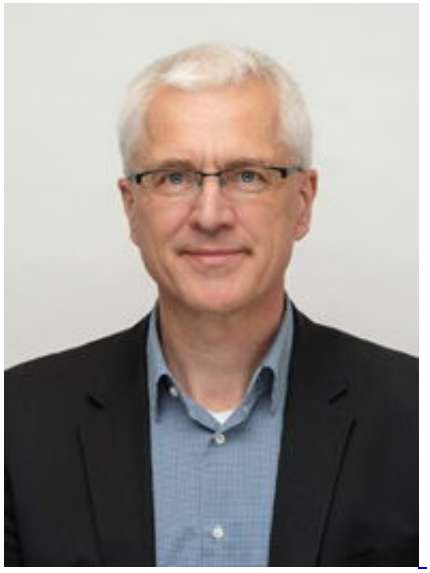
Aspergillus fumigatus is an opportunistic human pathogenic fungus causing severe infections in immunocompromised patients. Cyclic AMP (cAMP) signal transduction plays an important role in virulence. A central component of this signaling cascade is protein kinase A (PKA), which regulates cellular processes by phosphorylation of specific target proteins. Here we describe the generation and analysis of A. fumigatus mutants expressing the gene encoding the catalytic subunit of PKA, pkaC1, under control of an inducible promoter. Strains overexpressing pkaC1 showed high PKA activity, reduced growth, sporulation deficiency, and formation of a dark pigment in the mycelium. These data indicate that cAMP-PKA signaling is involved in the regulation of important processes, such as growth, asexual reproduction, and biosynthesis of secondary metabolites. Furthermore, elevated PKA activity led to increased expression of the pksP gene. The polyketide synthase PksP is an essential enzyme for production of dihydroxynaphthalene-melanin in A. fumigatus and contributes to virulence. Our results suggest that increased pksP expression is responsible for pigment formation in the mycelium. Comparative proteome analysis of the

pkaC1-overexpressing strain and the wild-type strain led to the identification of proteins regulated by the cAMP-PKA signal transduction pathway. We showed that elevated PKA activity resulted in activation of stress-associated proteins and of enzymes involved in protein biosynthesis and glucose catabolism. In contrast, proteins which were involved in nucleotide and amino acid biosynthesis were downregulated, as were enzymes involved in catabolism of carbon sources other than glucose.

Beteiligte Forschungseinheiten

Molekulare und Angewandte Mikrobiologie Axel Brakhage Mehr erfahren

Leibniz-HKI-Autor*innen



Axel A. Brakhage

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Alexander Gehrke

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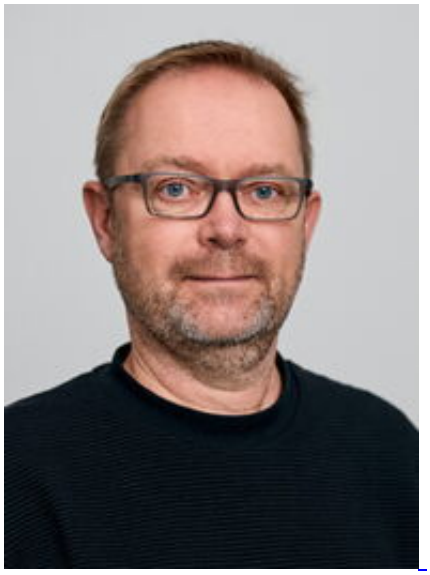

Thorsten Heinekamp

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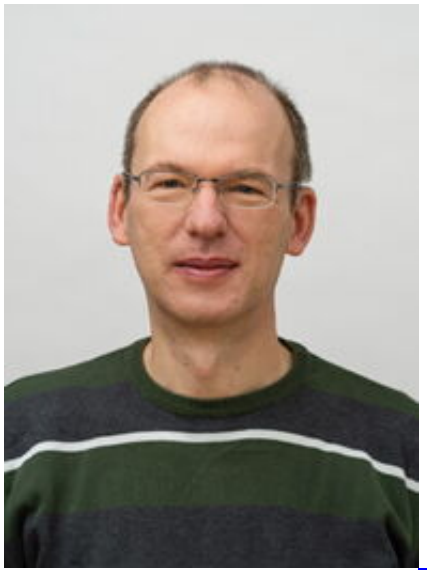

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