Functional characterization of the *Aspergillus fumigatus* calcineurin.

da Silva Ferreira ME, Heinekamp T, Härtl A, Brakhage AA, Semighini CP, Harris SD, Savoldi M, de Gouvêa PF, de Souza Goldman MH, Goldman GH (2007) Functional characterization of the *Aspergillus fumigatus* calcineurin. *Fungal Genet Biol* 44(3), 219-230.

Abstract

Aspergillus fumigatus is an aggressive opportunistic pathogen of humans as well as a major allergen. Environmental sensing and retrieving essential nutrients from the environment are general metabolic traits associated with the growth of this saprophytic fungus. Two important mediators of calcium signals in eukaryotic cells are the Ca(2+)-binding protein calmodulin and the Ca(2+)/calmodulin-dependent phosphatase calcineurin. Calcineurin is a heterodimer that consists of a catalytic subunit A and a Ca(2+)/calmodulin binding unit. We deleted the A. fumigatus calA gene, which encodes the calcineurin A catalytic subunit, and demonstrated that this gene is not essential in this fungus. The DeltacalA mutant strain has severe defects in growth extension, branching and conidial architecture. Furthermore, the A. fumigatus DeltacalA mutant strain has decreased fitness in a low dose murine infection and cannot grow in fetal bovine serum (FBS). After potassium phosphate was added to liquid FBS, the DeltacalA mutant strain could grow with the characteristic phenotype of the DeltacalA mutation. When A. fumigatus calcineurin is inhibited by tacrolimus in a phosphate depleted medium, there is a reduction in the inorganic phosphate

transport and six putative phosphate transporter genes have altered mRNA levels. However, there is no effect on the acid phosphatase activity. These results suggest that calcineurin is involved in the regulation of the PHO pathway in A. fumigatus. Our work on calcineurin opens new venues for the research on sensing and nutrient acquisition in A. fumigatus.

Beteiligte Forschungseinheiten

Mikrobielle Pathogenitätsmechanismen Bernhard Hube Mehr erfahren

Molekulare und Angewandte Mikrobiologie Axel Brakhage Mehr erfahren

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