

Transcription Factor SomA Is Required for Adhesion, Development and Virulence of the Human Pathogen *Aspergillus fumigatus*

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Abstract

The transcription factor Flo8/Som1 controls filamentous growth in *Saccharomyces cerevisiae* and virulence in the plant pathogen *Magnaporthe oryzae*. Flo8/Som1 includes a characteristic N-terminal LUG/LUH-Flo8-single-stranded DNA binding (LUFS) domain and is activated by the cAMP dependent protein kinase A signaling pathway. Heterologous SomA from *Aspergillus fumigatus* rescued in yeast *flo8* mutant strains several phenotypes including adhesion or flocculation in haploids and pseudohyphal growth in diploids, respectively. *A. fumigatus* SomA acts similarly to yeast Flo8 on the promoter of *FLO11* fused with reporter gene (*LacZ*) in *S. cerevisiae*. *FLO11* expression in yeast requires an activator complex including Flo8 and Mfg1. Furthermore, SomA physically interacts with PtaB, which is related to yeast Mfg1. Loss of the *somA* gene in *A. fumigatus* resulted in a slow growth phenotype and a block in asexual development. Only aerial hyphae without further differentiation could be formed. The deletion phenotype was verified by a

conditional expression of *somA* using the inducible Tet-on system. A adherence assay with the conditional *somA* expression strain indicated that SomA is required for biofilm formation. A *ptaB* deletion strain showed a similar phenotype supporting that the SomA/PtaB complex controls *A. fumigatus* biofilm formation. Transcriptional analysis showed that SomA regulates expression of genes for several transcription factors which control conidiation or adhesion of *A. fumigatus*. Infection assays with fertilized chicken eggs as well as with mice revealed that SomA is required for pathogenicity. These data corroborate a complex control function of SomA acting as a central factor of the transcriptional network, which connects adhesion, spore formation and virulence in the opportunistic human pathogen *A. fumigatus*.

Beteiligte Forschungseinheiten

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