The MAP kinase MpkA controls cell wall integrity, oxidative stress response, gliotoxin production and iron adaptation in *Aspergillus fumigatus*.

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Abstract

The saprophytic fungus Aspergillus fumigatus is the most important air-borne fungal pathogen. The cell wall of A. fumigatus has been studied intensively as a potential target for development of effective antifungal agents. A major role in maintaining cell wall integrity is played by the mitogen-activated protein kinase (MAPK) MpkA. To gain a comprehensive insight into this central signal transduction pathway, we performed a transcriptome analysis of the ΔmpkA mutant under standard and cell wall stress conditions. Besides genes involved in cell wall remodelling, protection against ROS and secondary metabolism such as gliotoxin, pyomelanin and pseurotin A, also genes involved in siderophore biosynthesis were regulated by MpkA. Consistently, northern and western blot analyses indicated that iron starvation triggers phosphorylation and thus activation of MpkA. Furthermore, localization studies indicated that MpkA accumulates in the nucleus under iron depletion. Hence, we report the first connection between a MAPK pathway and siderophore biosynthesis. The measurement of amino acid pools and of the pools of polyamines indicated that

arginine was continuously converted into ornithine to fuel the siderophore pool in the ΔmpkA mutant strain. Based on our data, we propose that MpkA fine-tunes the balance between stress response and energy consuming cellular processes.

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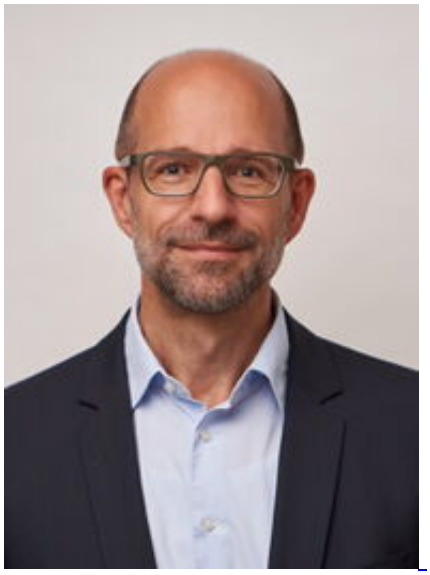

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