

The *Aspergillus fumigatus* cell wall integrity signaling pathway: drug target, compensatory pathways, and virulence.

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Abstract

Aspergillus fumigatus is the most important airborne fungal pathogen, causing severe infections with invasive growth in immunocompromised patients. The fungal cell wall (CW) prevents the cell from lysing and protects the fungus against environmental stress conditions. Because it is absent in humans and because of its essentiality, the fungal CW is a promising target for antifungal drugs. Nowadays, compounds acting on the CW, i.e., echinocandin derivatives, are used to treat *A. fumigatus* infections. However, studies demonstrating the clinical effectiveness of echinocandins in comparison with antifungals currently recommended for first-line treatment of invasive aspergillosis are still lacking. Therefore, it is important to elucidate CW biosynthesis pathways and their signal transduction cascades, which potentially compensate the inhibition caused by CW-perturbing compounds. Like in other fungi, the central core of the cell wall integrity (CWI) signaling pathway in *A. fumigatus* is composed of three mitogen activated protein kinases. Deletion of these genes resulted in severely enhanced sensitivity of the mutants against CW-disturbing compounds

and in drastic alterations of the fungal morphology. Additionally, several cross-talk interactions between the CWI pathways and other signaling pathways are emerging, raising the question about their role in the CW compensatory mechanisms. In this review we focused on recent advances in understanding the CWI signaling pathway in *A. fumigatus* and its role during drug stress response and virulence.

Beteiligte Forschungseinheiten

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