Abstract

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Diploma Thesis: Susceptibility profile of biofilms of non-*albicans* *Candida* spp. to echinocandins

Yeasts of the genus *Candida* are one of the most frequent human fungal pathogens. Infections caused by them are related to a specific form of growth – biofilm (BF), which has increased their resistance to antifungal treatment. Since bloodstream infections caused by non-*albicans Candida* species are increasing, it is important to focus on their susceptibility characteristics.

The main aim of our experiment was to examine the susceptibility profiles of BF produced by rare non-*albicans Candida* species to echinocandins. We tested 3 species of the genus *Candida* – *C. lusitaniae, C. guilliermondii* and *C. krusei* and 3 different echinocandins – anidulafungin (AND), caspofungin (CAS) and micafungin (MFG). Echinocandins have unique mechanisms of action. They inhibit the function of the enzyme β-1,3-glucan synthase. Disruption of its function leads to inhibition of β-1,3-glucan production, damage of fungal cell wall and loss of viability of the cell.

In experimental part we used YNB medium and RPMI 1640 medium to grow *Candida* species BF and planktonic cells (PL). We incubated both BF and PL in 96-well microtiter polystyrene plates. Antifungal activity was assessed by the 2,3-bis[2-methoxy-4-nitro-5-sulfophenyl]2H-tetrazolium-5-carboxanilide (XTT) metabolic assay. Each drug concentration was processed in pentaplicate for each isolate.

Results indicate that MFG have the lowest MIC_{50} and that it is the most

efficient drug to all tested species. MFG to BF formed by *C. krusei* (MIC_{50} 0.125 mg/L) was most efficient, followed by *C. guilliermondii* (MIC_{50} 2 mg/L) and less susceptible *C. lusitaniae* BF (MIC_{50} 16 mg/L). AND was most efficient against *C. krusei* BF (MIC_{50} 0.125 mg/L), then *C. guilliermondii* (MIC_{50} 4 mg/L) and *C. lusitaniae* (MIC_{50} >256 mg/L). CAS was most efficient against *C. krusei* BF (MIC_{50} 1 mg/L), then against *C. guilliermondii* (MIC_{50} 32 mg/L) and *C. lusitaniae* (MIC_{50} 32 mg/L).

In the conclusion of our project we pronounced our findings stating that echinocandins seem to be efficient against non-*albicans Candida* biofilms in vitro. Biofilm was more resistant to echinocandins than planktonic cells.

Key words: echinocandins, biofilm, *Candida*, resistance, XTT