Treatment of biofilm infections and development of biofilm resistance

133: Mnn2 Gene Affects Drug Resistance in Candida glabrata’s Biofilms

Session C

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Infections caused by Candida species have increased worldwide substantially over the latest decades, and are a significant cause of morbidity and mortality, mostly among critically ill patients. Candida glabrata is the second most common Candida responsible for these infections in the USA and the third in Europe, and is characterized by a high antifungal resistance. In this work, a study on biofilms was performed with four C. glabrata strains including the wild-type (ATCC2001), a vaginal isolate (534784), a mutant (Δmnn2) and its parent (HT6). Susceptibility to antifungal agents (fluconazole-Flu, amphotericin B-AmB, caspofungin-Csf and micafungin-Mcf), confocal microscopy, quantification of biomass (Crystal Violet assay), mannans (Quantitative Alcian Blue Binding Assay), protein (BCA® Kit), polysaccharides (Dubois method) and β-1,3 glucans (Glucatell® Kit) were evaluated on 48-hour-biofilms. Interestingly, the results have shown that both the mutant and the parent strain were more resistant than the wild-type and the isolate strains to all antifungals. Mannans were detected in all biofilms, except those of Δmnn2. Comparing to the control, polysaccharides increased in the biofilm matrices of all strains in the presence of Flu and AmB, but not Csf and Mcf. Proteins were not detected in any biofilm matrix. The biomass decreased in all strains when in the presence of antifungals, but the percentage of reduction was dependent on the strain and drug. Previously, it was indicated that C. glabrata Mnn2 mannosyltransferases affect the structure of the fungal N-linked mannan with repercussions for cell wall integrity and, consequently, planktonic cells’ virulence. Thus, and contrasting to Candida albicans, the increased resistance of C. glabrata Δmnn2 biofilms may be related to changes both on biofilm cell membrane and biofilm matrix composition.

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