Monitoring of fluconazole and caspofungin activity against *in vivo Candida glabrata* biofilms by bioluminescence imaging.

Persyn A, Rogiers O, Brock M, Vande Velde G, Lamkanfi M, Jacobsen ID, Himmelreich U, Lagrou K, Van Dijck P, Kucharíková S (2018) Monitoring of fluconazole and caspofungin activity against *in vivo Candida glabrata* biofilms by bioluminescence imaging. *Antimicrob Agents Chemother* 63(2), e01555-18.

Details

Abstract

Candida glabrata can attach to various medical implants and forms thick biofilms despite its inability to switch from-yeast-to hyphae. Current in vivo C. glabrata biofilm models only provide limited information about colonization and infection and usually require animal sacrifice. To gain real-time information from individual BALB/c mice we developed a non-invasive imaging technique to visualize C. glabrata biofilms in catheter fragments that were subcutaneously implanted on the back of mice. Bioluminescent C. glabrata reporter strains (lucOPT 7/2/4 and lucOPT 8/1/4), free of auxotrophic markers, expressing a codon-optimized firefly luciferase were generated. A murine subcutaneous model was used to follow real-time in vivo biofilm formation in the presence and

absence of fluconazole and caspofungin. Fungal load in biofilms was quantified by colony forming unit counts and by bioluminescence imaging (BLI). C. glabrata biofilms formed within the first 24 h, as documented by the increased number of device-associated cells and elevated bioluminescent signal compared to adhesion at the time of implant. The in vivo model allowed monitoring of the anti-biofilm activity of caspofungin against C. glabrata biofilms through bioluminescent imaging from day four after initiation of treatment. Contrarily, signals emitted from biofilms implanted in fluconazole-treated mice was similar to the light emitted from control-treated mice.This study gives insights into real-time development of C. glabrata biofilms under in vivo conditions. BLI proved to be a dynamic, non-invasive and sensitive tool to monitor continuous biofilm formation and activity of antifungal agents against C. glabrata biofilms formed on abiotic surfaces in vivo.

Beteiligte Forschungseinheiten

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Identifier

doi: 10.1128/AAC.01555-18

PMID: 30420485