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A SYNTHETIC KILLER PEPTIDE IMPAIRS CANDIDA ALBICANS BIOFILM FORMATION AND PERSISTENCE IN VITRO
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Introduction: Candida spp. colonize human skin and mucosa of healthy subjects, behaving as harmless commensals. Nevertheless, in susceptible patients, they behave as opportunistic pathogens also due to their capacity to form biofilm on host mucosa or medical device surfaces. When embedded in a biofilm, Candida exhibits enhanced tolerance to common disinfectants and most antifungals, including azoles. Thus, there is an urgent need to identify novel therapeutic molecules. Recently, several antibody-derived peptides proved to exert antimicrobial, antiviral, immunomodulatory and antitumor activity in vitro and in vivo. The aim of this study was to investigate the effects of a synthetic killer peptide (KP) on the formation and persistence of Candida biofilm.

Materials and Methods: C. albicans reference strain SC5314, two fluconazole-resistant and two fluconazole-susceptible C. albicans isolates were used. The activity of KP (AKVTMTCAS) together with a scrambled peptide (negative control), was tested against Candida biofilms at different stages of development by microscopy, crystal violet and tetrazolium salt reduction assays. qRT-PCR was used to evaluate the effect of KP on biofilm related genes.

Results: KP strongly influenced C. albicans capacity of to form biofilm and significantly impaired mature biofilm. In particular, KP treatment induced Candida oxidative stress response, altered fungal cell membrane permeability and markedly impaired biofilm-related gene expression. Similar inhibitory effects were observed against all the yeast strains tested, irrespective of their resistance or susceptibility to fluconazole. Interestingly, the KP-mediated inhibitory effect was confirmed against a catheter-associated C. albicans biofilm.

Conclusions: These results provide the first evidence for the efficacy of KP against C. albicans biofilm, suggesting that this peptide may represent a novel potential molecule for treatment and prevention of biofilm-related C. albicans infections.