

The effect of *S. mutans* on the growth and virulence expression of *C. albicans* in a mixed species biofilm

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ABSTRACT

Introduction: It is known that in polymicrobial biofilms, interactions among inhabitant species can alter gene expressions to affect physiological and pathogenic properties. *Candida albicans* and *Streptococcus mutans* are major components of the oral microbiome co-existing in biofilms adherent on dental surfaces. **Objective:** In this study, the effect of *S. mutans* on the biofilm growth and expression of virulence in *C. albicans* is studied in a mixed species biofilm populated by both organisms. **Materials and methods:** Biofilms of *C. albicans* ATCC 10231 and a 1:10 mixture of *C. albicans* and *S. mutans* ATCC 25175 were grown in 6-welled cell culture plates. At the end of incubation, RNA extracted from the biofilms were tested in RT-qPCR assays for the expression of *C. albicans* quorum sensing genes *CHK1* and *PBS2*, and virulence genes *HWP1* and *EFG1*. The viable counts of *C. albicans* and *S. mutans* were also obtained separately using the Miles and Misra method. The results from single species and mixed species biofilms were compared. **Results and conclusion:** In both pure and mixed biofilms, the viable count of *C. albicans* increased at end of biofilm formation, indicating no suppression of *C. albicans* growth in the presence of *S. mutans*. In contrast, the viable count of *S. mutans* in the mixed species biofilm decreased at end of biofilm formation, suggesting that *C. albicans* suppressed the growth of *S. mutans* and increased its cell death. The RT-qPCR results did not show a significant difference between the expression of the four genes in pure and mixed species biofilms. This could be explained by the attainment of the same *C. albicans* viable counts in pure and mixed biofilms and non-interference from *S. mutans*. In an in vitro mixed species biofilm, *C. albicans* was not adversely affected by *S. mutans* in its growth or expression of virulence. Instead, it apparently suppressed the growth and survival of *S. mutans*.