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Editorial

Adhesion of Candida Species to Stainless Steel Surfaces under Various Growth Conditions

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Introduction

Invasive fungal infections, such as candidiases, represent a public health problem of major importance. Candida species are commensal micro-organisms that become pathogenic when the defence mechanisms of the host are weakened, and these organisms then have the ability to cause a variety of superficial and systemic infections. In the past twenty years, Candida species are responsible for around 80% of fungal infections in the hospital environment. Although most cases of candidiases have been attributed to Candida albicans, more recently, non-albicans Candida species, such as *Candida krusei, Candida glabrata and Candida parapsilosis* have been identified as frequent human pathogens [1,2]. The first event in Candida infection is its adherence of the organism to host and/or medical-device surfaces, often leading to the formation of biofilm [3,5]. The formation of Candida biofilms carries important clinical repercussions because of their increased resistance to antifungal therapy and the ability of cells within biofilms to withstand host immune [7,9]. Hence, device-related infections are difficult to treat, and affected devices often need to be removed, which can be hazardous for some patients [10]. It is therefore important to focus attention on how to prevent and control biofilm formation in such applications.

The aim of our study is to provide better understanding on adhesion behaviors of Candida species to stainless steel surfaces, material typical for medical devices. The factors considered here are medium composition, growth temperature and roughness of stainless steel surface.

Methods

In our study we investigated the impact of growth medium and temperature on adhesion of Candida species to stainless steel (AISI 304) discs with different degrees of surface roughness (Ra = 25.20 – 961.9 nm). The adhesion of the yeast strains to stainless steel discs grown in Malt Extract broth (MEB) or YPD broth at three temperatures 7°C, 37°C, 43°C was assessed by crystal violet staining.

Results and Discussion

The results showed that the nutrient content of medium significantly influenced the quantity of adhered cells by the tested yeasts. Adhesion of *C. albicans and C. glabrata* on stainless steel surfaces were significantly higher in MEB, whereas for *C. parapsilosis and C. krusei* it was YPD broth. On the other hand, our data indicated that temperature is a very important factor which considerably affects the adhesion of these yeasts. Non-albicans Candida spp. were adhered to the highest extent at 37°C, while *C. albicans* showed different behavior with a much greater propensity for adherence at 43°C [8]. Worthy of note is the fact that the ability to adhere to stainless steel at an elevated temperature (above 37°C) is also an important virulence trait of Candida [4], which is important in clinical setting particularly for the patients with stents [3,6].

Conclusion

An understanding of adhesion behavior of Candida spp. under different environmental conditions is key to the development of effective preventive measures against biofilm-associated infection.

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