Host-Fungal Interfaces

In the last decades the role of fungal organisms as a cause of nosocomial bloodstream infections in hospitalized patients has increased dramatically (Pfaller and Diekema, Crit Rev Microbiol 2010). Candidemia is a serious burden on the healthcare as it is associated with difficult treatment, lengthy hospital stays and high mortality rate (Tortorano et al., J Hosp Infect 2004; Leleu et al., J Crit Care 2002). Thus, fungal sepsis is costly, difficult to manage illness that frequently results in fatalities.

A significant proportion of all human microbial infections involve biofilms, surface-associated microbial communities encased in extracellular matrix and highly resistant to antibiotic treatment, and Candida spp. are no exception (Kojic and Darovic, Clin Microbiol Rev 2004). Candida spp. biofilms are the third leading cause of catheter-related infections, with Candida albicans being responsible for over 50% of the cases. Other manifestations, such as oropharyngeal candidiasis, denture stomatitis and vaginal candidiasis, are also frequently associated with C. albicans biofilm growth. Treatment of such infections is frequently challenging due to high resistance to conventional antifungal therapy.

The Host Fungal Interfaces group focuses on identifying the mechanisms and the processes involved in Candida spp. biofilm development and persistence. Specifically, we aim to understand the mechanism of pH modulation by Candida spp. in response to metabolic changes and the effect of this phenomenon on biofilm formation.
Environmental pH modulation by the fungal pathogen *Candida albicans*. Upon growth on amino acids as the primary carbon source *C. albicans* extrudes ammonia to neutralize the environmental pH within a matter of few hours (A; C). This process is controlled by the transcription factors Stp2p and Ahr1p and leads to hyphal morphogenesis, a potent virulence factor (B). We want to investigate whether and how environmental neutralization contributes to biofilm formation and virulence (D).