Jena School for Microbial Communication
Graduate School of Excellence

PhD project title: Impact of microbiota and *Candida albicans* colonization on systemic immune responses

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Abstract:

The human body is home to a multitude of microorganisms, of which the fungus *Candida albicans* is a common member. Under normal conditions this organism is harmless but should a situation of immunosuppression or dysbiosis arise, it can turn into a lethal pathogen. In fact, fungal infections affect approximately an alarming 2 billion people worldwide and thus have a major impact on human health. Clinical and economic burden increases drastically due to *Candida* bloodstream infections known as systemic candidiasis.

C. albicans interacts with a number of other commensals in different locations in the body such as gut, vagina and skin. Current research highlights the importance of the microbiome in shaping the host immune response both at mucosal sites and systemically. Recently published studies suggest that *C. albicans* gut colonization provides protection against life-threatening systemic infection. For instance, one study found out that colonized mice have higher serum anti-*C. albicans* IgG antibodies compared to infected mice (Huertas et al. 2016), while another showed that colonization drives Th17 CD4+ T cells and IL-17 that ultimately promotes neutrophil response (Shao et al. 2019). In regard to this, my project will focus on studying the systemic innate immune response to invasive candidiasis.

The aim of this project is to study the interplay between the microbiota and *C. albicans* during colonization and their impact on the host systemic immune responses. The research question we aim to answer is ‘to which extent the microbiome, and specifically the mycobiome affects resistance to systemic candidiasis’ This project will help in addressing how variations in the host and microbiota affect *C. albicans* virulence and infection outcome, which in turn might pave the way to identify novel biomarkers.