



## Christine Dunker

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### The role of filamentation in the pathogenesis of candidiasis

The yeast *Candida albicans* is a human commensal which, under certain circumstances, can cause both superficial and life-threatening systemic infections. The ability of the fungus to switch between the yeast and the fungal growth form is believed to play an important role in virulence. Hyphal formation is essential for invasion into epithelial or endothelial cells *in vitro*, and *C. albicans* mutants locked in either the yeast or in the hyphal form usually exhibit reduced virulence in systemic murine infections. However, our own data show that systemic infections of mice with the filamentation-deficient *C. albicans* mutant *eed1Δ* can lead to mortality in the absence of hyphae.

Other groups have identified additional filament-deficient mutants fully virulent or only moderately attenuated in the septic mouse model. These recent findings challenge the longstanding hypothesis that morphogenesis is essential for candidiasis. This project aims to clarify the role of hyphal formation for pathogenesis of *C. albicans* sepsis by using defined molecular approaches including mutants in which morphogenesis is under the control of a regulatable promoter. The effect of morphology on virulence will be studied in different infection models, particularly with regard to the ability to induce tissue damage, interaction with immune cells and induction of sepsis.

## Publications

Ramírez-Zavala B, Krüger I, Dunker C, Jacobsen ID, Morschhäuser J (2022) The protein kinase Ire1 has a Hac1-independent essential role in iron uptake and virulence of *Candida albicans*. *PLoS Pathog* 18(2), e1010283. [Details](#) [PubMed](#)

Dunker C, Polke M, Schulze-Richter B, Schubert K, Rudolphi S, Greßler AE, Pawlik T, Prada Salcedo JP, Niemiec MJ, Slesiona-Künzel S, Swidergall M, Martin R, Dandekar T, Jacobsen ID (2021) Rapid proliferation due to better metabolic adaptation results in full virulence of a filament-deficient *Candida albicans* strain. *Nat Commun* 12(1), 3899. [Details](#) [PubMed](#)

Gerwien F, Dunker C, Brandt P, Garbe E, Jacobsen ID, Vylkova S (2020) Clinical *Candida albicans* Vaginal Isolates and a Laboratory Strain Show Divergent Behaviors during Macrophage Interactions. *mSphere* 5(4), [Details](#) [PubMed](#)

Irmscher S, Döring N, Halder LD, Jo EAH, Kopka I, Dunker C, Jacobsen ID, Luo S, Slevogt H, Lorkowski S, Beyersdorf N, Zipfel PF, Skerka C (2017) Kallikrein Cleaves C3 and Activates Complement. *J Innate Immun* , [Details](#) [PubMed](#)

Miramón P, Dunker C, Kasper L, Jacobsen ID, Barz D, Kurzai O, Hube B (2014) A family of glutathione peroxidases contributes to oxidative stress resistance in *Candida albicans*. *Med Mycol* 52(3), 223-239. [Details](#) [PubMed](#)

Miramón P, Dunker C, Windecker H, Bohovych IM, Brown AJ, Kurzai O, Hube B (2012) Cellular responses of *Candida albicans* to phagocytosis and the extracellular activities of neutrophils are critical to counteract carbohydrate starvation, oxidative and nitrosative stress. *PLoS One* 7(12), e52850. [Details](#) [PubMed](#)

## Supervisor

[Ilse Jacobsen](#)

## Co-Supervisors

[Bernhard Hube](#)

## Start of PhD

June 1, 2013

## Doctoral Disputation

April 22, 2022