Job Advertisement
Leibniz-HKI-53/2021

Leibniz Institute
for Natural Product Research
and Infection Biology
Hans Knöll Institute

The **Leibniz Institute for Natural Product Research and Infection Biology – Hans Knöll Institute** (Leibniz-HKI, www.leibniz-hki.de) investigates the pathobiology of human-pathogenic fungi and identifies targets for the development of novel natural product-based antibiotics. The department of **Microbial Pathogenicity Mechanisms** invites talented and highly gifted candidates to apply as a

Doctoral Researcher (f/div/m) in Microbial Pathogenicity Mechanisms

for three years initially.

Research Areas: Microbiology, Mycology, Infection Biology

The project will be co-financed by the Deutsche Forschungsgemeinschaft (DFG) and related to the DFG Priority Programme SPP 2225 **"Exit strategies of intracellular pathogens"**

Project background:

Fungi infect billions of people annually, kill as many people as tuberculosis or malaria and are a major problem for healthcare. *Candida albicans* is a major opportunistic fungal pathogen and frequently causes superficial or even fatal infections. However, most humans are asymptotically colonized by this fungus as a part of their commensal microbiota. We are a leading research group in the investigation of *Candida* spp. pathogenicity mechanisms including their interaction with immune cells, their nutrient acquisition strategies, their evolution and adaptation in pathogenicity, the mechanisms involved in the commensal-to-pathogen shift and their capacity to cause host damage.

In this project, the successful applicant will use sophisticated *in vitro* model systems to investigate important aspects of *C. albicans*' interaction networks during confrontation with macrophages. The overarching goal is to elucidate the pathogenicity mechanisms which lead to escape of *C. albicans* from macrophages after phagocytosis.

Candidate´s profile:

We expect a Master´s degree (or equivalent) in Life Sciences (e.g. Biology, Biochemistry, or Microbiology). Furthermore, the applicant should be able to perform team-oriented as well as independent work. Experimental background in one or more of the following subjects are beneficial: Microbiology, Infection Biology, Immunology, Cell Biology. Practical experience in cell culture, fluorescence microscopy and fungal genetics is an advantage. Very good communication skills in English are necessary.

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We offer:

The successful candidate will be hosted in the department **Microbial Pathogenicity Mechanisms**. The Leibniz-HKI is embedded in the outstanding scientific environment of the Beutenberg Campus providing state-of-the-art research facilities and a highly integrative network of life science groups. We offer a multifaceted scientific project with excellent technical facilities, a place in a dynamic, committed team, as well as strong scientific collaborations. The PhD candidate will participate in the structured program of the **International Leibniz Research School** and become an associated member of the **Jena School of Microbial Communication.**

Salary is paid according to German TV-L (salary agreement for public service employees). As an equal opportunity employer, the Leibniz-HKI is committed to increasing the percentage of female scientists and therefore especially encourages them to apply.

Further information:

Prof. Dr. Bernhard Hube | +49 3641 532 1400 | career@leibniz-hki.de

Applications:

Complete applications in English, including a cover letter with a brief statement of research experiences, a CV with a complete list of publications, and the addresses of two possible referees should be submitted via the Leibniz-HKI **online application system**. The deadline for the advertisement is **November 5, 2021**, but applications will be reviewed on a rolling basis.

References:

König A, Hube B, Kasper L (2020) The dual Function of the fungal toxin candidalysin during *Candida albicans*-macrophage interaction and virulence. *Toxins* 12(8), 469. (Review)

König A, Müller R, Mogavero S, Hube B (2020) Fungal factors involved in host immune evasion, modulation and exploitation during infection. *Cell Microbiol* 23(1), e13272. (Review)

Sprenger M, Hartung TS, Allert S, Wisgott S, Niemiec MJ, Graf K, Jacobsen ID, Kasper L, Hube B (2020) Fungal biotin homeostasis is essential for immune evasion after macrophage phagocytosis and virulence. *Cell Microbiol* 22(7), e13197.

Westman J, Walpole GFW, Kasper L, Xue BY, Elshafee O, Hube B, Grinstein S (2020) Lysosome fusion maintains phagosome integrity during fungal infection. *Cell Host Microbe* 28(6), 798-812.

Kasper L, König A, Koenig PA, Gresnigt MS, Westman J, Drummond RA, Lionakis MS, Groß O, Ruland J, Naglik JR, Hube B (2018) The fungal peptide toxin Candidalysin activates the NLRP3 inflammasome and causes cytolysis in mononuclear phagocytes. *Nat Commun* 9(1), 4260.

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Detailed project description

Candida albicans is causing superficial but also life-threatening systemic infections with high morbidity and mortality. Innate immune cell like macrophages provide the first line of defense against invading pathogens, however, *C. albicans* has developed immune evasion strategies. Macrophage-internalized *C. albicans* cells can survive, grow inside macrophages as hyphae and ultimately escape from macrophages and lyse these immune cells (Kasper *et al*. 2018 Nat. Commun.).

The doctoral researcher will investigate biological events which are crucial for the pathogenesis of this common pathogenic fungus. This includes the triggers for *C. albicans* hypha formation inside macrophages and the strategies by which *C. albicans* acquires nutrients inside macrophages. The candidate will identify and characterize fungal factors associated with phagosomal damage, host cell killing and escape. The interaction between *C. albicans* and macrophages will be studied using *in vitro* cultured primary macrophages and cell lines. With tools such as screening large-scale mutant libraries, microscopic imaging, generation of *Candida* mutants as well as transcriptional profiling, the candidate will investigate the molecular mechanisms underlying *C. albicans'* escape from macrophages.

The project will be integrated into the Department of Microbial Pathogenicity Mechanisms (MPM) of the HKI Jena, but also the DFG SPP2225 Exit consortium.

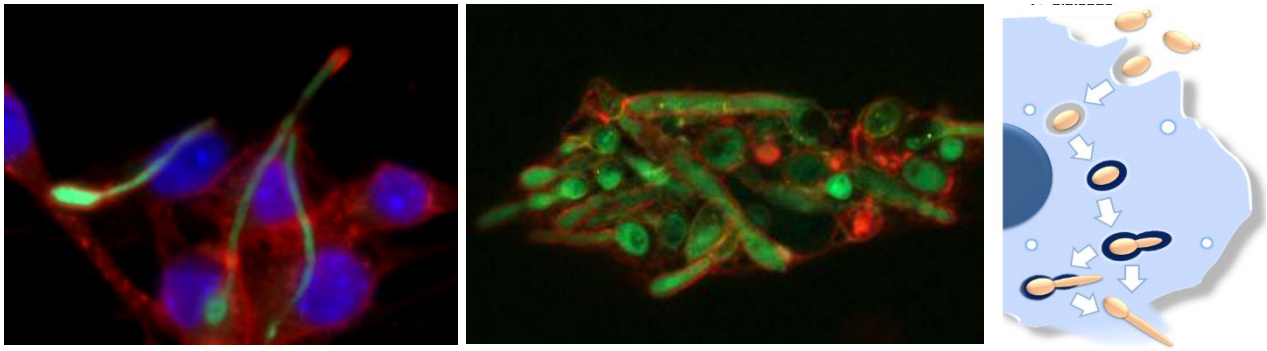

Fig. 1 *C. albicans* cells produce hyphae inside macrophages causing host cell killing and permitting escape.

References:

König A, Hube B, Kasper L (2020) The dual Function of the fungal toxin candidalysin during Candida albicans-macrophage interaction and virulence. Toxins 12(8), 469. (Review)

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