

Pressemitteilung**Friedrich-Schiller-Universität Jena****Juliane Seeber**

19.11.2024

<http://idw-online.de/de/news843212>Forschungsergebnisse, Wissenschaftliche Publikationen
Biologie, Medizin
überregional**Drug resistant fungi spreading: Focus on Candida parapsilosis**

The yeast *Candida parapsilosis* is emerging as a growing threat for hospitalized patients in a new study. A team led by Dr Amelia Barber from the Cluster of Excellence "Balance of the Microverse" at Friedrich Schiller University Jena and Dr Grit Walther from the National Reference Centre for Invasive Fungal Infections (NRZMyk) investigated an outbreak of multi-drug resistant hospital-acquired strain of this fungus. The researchers developed a new molecular detection method that can quickly and cost-effectively differentiate strains of *C. parapsilosis*. The results were published in *The Lancet Microbe*.

Candida parapsilosis is a yeast fungus that can colonise the skin and digestive tract of humans and is usually harmless. However, it can cause severe wound and tissue infections, including life-threatening septicaemia, in people who are immunocompromised as a result of cancer or organ transplants or with serious medical conditions requiring prolonged hospitalizations.

Just as antibiotics are used to treat bacterial infections, antifungal agents are used to treat fungal infections. In recent years, however, the frequency of strains that are resistant to these drugs has increased dramatically, making these infections much more difficult to treat.

A dangerous fungus is spreading

The study provides a detailed genomic analysis of a long-lasting outbreak event caused by antimicrobial-resistant *C. parapsilosis* in several healthcare facilities in Berlin. The research team found that a single, genetically indistinguishable strain alone caused 33 invasive infections between 2018 and 2022. Although the number may sound small at first, invasive infections always require intensive medical care and lead to severe impairment of quality of life. What is particularly worrying is that the pathogen was spread from person to person and also across different facilities. Its resistance to the preferred antifungal drugs makes it a serious threat.

Significantly, the strain from the Berlin hospitals was closely related to strains already found in Canada, the Middle East and East Asia, demonstrating the global spread of drug-resistant fungi.

Development of an innovative typing scheme

In their study, the researchers not only uncovered the genetic relationships and transmission dynamics of the strains of *C. parapsilosis* associated with the outbreak, but also developed a new identification (typing) strategy for this pathogen. This typing strategy, known as Multilocus Sequence Typing (MLST), involves sequencing multiple short DNA regions to genetically distinguish strains. This offers a cheaper and faster alternative to whole genome sequencing.

"The newly developed MLST scheme enables rapid and cost-effective differentiation and tracking of *C. parapsilosis* strains. This allows us to react quickly to new outbreaks and effectively contain this often drug-resistant fungus. This is

particularly valuable when genome sequencing is simply not possible due to cost or lack of local bioinformatics knowledge," explains Dr Amelia Barber, head of the Fungal Informatics junior research group at University of Jena.

Dr Grit Walther, co-author of the paper and co-director of the NRZMyk at the Leibniz Institute for Natural Product Research and Infection Biology - Hans Knöll Institute (Leibniz-HKI), adds: "The study highlights the importance of quickly recognizing fungal infections and possible resistance in order to prevent transmission to other patients or other facilities. If clinics do not have the facilities to carry out the MLST themselves, they can contact the NRZMyk if an outbreak is suspected."

Excellent collaborative research

The study was the result of an interdisciplinary collaboration between the two main authors, Dr Amelia E. Barber and Dr Grit Walther, and experts from the Paulinen Hospital and diagnostic laboratories in Berlin. The work was funded by the German Research Foundation (DFG) and the Federal Ministry of Education and Research (BMBF) and the Federal Ministry of Health (BMG). Amelia Barber is a member of the Cluster of Excellence "Balance of the Microverse" at Friedrich Schiller University. In this research network, scientists investigate the complex interactions within microbial communities and their effects on human health and the environment.

The NRZMyk, appointed by the Robert Koch Institute and the BMG, is the point of contact for doctors and microbiologists from all over Germany for questions relating to the diagnosis and treatment of invasive fungal infections. In addition to targeted counselling, the NRZMyk also offers special diagnostic procedures for the detection of invasive fungal diseases.

wissenschaftliche Ansprechpartner:

Dr. Amelia E. Barber
Junior Research Group "Fungal Informatics"
E-mail: amelia.barber@uni-jena.de

Originalpublikation:

Original publication: Phillip J T Brassington, MSc, Frank-Rainer Klefisch, Barbara Graf, Roland Pfüllere, Prof Oliver Kurzai, Grit Walther, Amelia E Barber, PhD
Genomic reconstruction of an azole-resistant *Candida parapsilosis* outbreak and the creation of a multi-locus sequence typing scheme: a retrospective observational and genomic epidemiology study
The Lancet Microbe, Volume 0, Issue 0, 100949



Colonies of *Candida parapsilosi*.
Photo: Grit Walther