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S'pore team discovers new strain of resistant fungus found in hospitals

Highly transmissible fungus affects mostly patients with severe underlying issues

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Researchers (from far left) Chayaporn Suphavilai, Lim Kar Mun, Tan Mei Gie, Niranjan Nagarajan and Karrie Ko inspecting cultures of *Candida auris (C. auris)*, a highly resistant and easily transmissible fungus normally found in hospitals. The new strain was detected in April 2023 after a patient at Singapore General Hospital tested positive for *C. auris*. PHOTO: A*STAR'S GENOME INSTITUTE OF SINGAPORE

Researchers in Singapore have discovered a new strain of *Candida auris (C. auris)*, a highly resistant and easily transmissible fungus normally found in hospitals.

By uncovering the new strain early, not only will surveillance strategies be improved to keep a close watch on its emergence and contain the spread, but doctors can also sidestep an infection that could potentially close hospital wards and cause serious infections in vulnerable patients.

This discovery – by a team from the Singapore General Hospital (SGH), the Genome Institute of Singapore (GIS) at the Agency for Science, Technology and Research, and the National University of Singapore's Yong Loo Lin School of Medicine – has brought the total number of *C. auris* clades, or groupings, known globally to six.

The new strain was detected in April 2023 after a patient at SGH tested positive for *C. auris*, which is commonly associated with overseas travel.

But the Singaporean had not been overseas for two years before he was admitted to the hospital.

Dr Karrie Ko, a consultant at the Department of Microbiology at SGH, told The Straits Times that the lack of travel history was among the points of interest that led to the investigation into this case.

"We initially hypothesised that the fungus was from the East Asian clade II, but a culture of the fungus from this case grew at 42 deg C, which suggests it does not belong to this strain," she said.

"We then performed further biochemical testing, and the results did not fit with any existing clades (I to V). Hence, we proceeded to further investigations to determine if the genome was unique," added Dr Ko.

She is also the genomics director of the Pathology Academic Clinical Programme under SingHealth and Duke-NUS Medical School.

After finding out that the patient's *C. auris* belonged to a clade that was genetically different from the existing five, the team looked through the hospital's archive and found two other cases.

One was an Indonesian patient who had been shuttling between the healthcare systems of Singapore and Indonesia.

The other was a Bangladeshi patient who had since returned to his country.

Dr Ko added that no treatment was needed for the Singaporean patient as he had no known infection and was asymptomatic.

Their discovery was published in peer-reviewed medical journal The Lancet Microbe in July 2024.

C. auris is a fungus that is highly transmissible and hard to get rid of.

It affects mostly patients with severe underlying medical conditions.

Those with invasive medical devices, such as breathing or feeding tubes and catheters, tend to be at higher risk of getting *C. auris* and developing a range of infections, from superficial to more severe, life-threatening ones.

The World Health Organisation listed *C. auris* as a critical priority for research and public health action in 2022.

A year later, the US Centres for Disease Control and Prevention declared the fungus an "urgent antimicrobial resistance threat" as it has become increasingly difficult to treat, further emphasising the need to understand and mitigate this public health threat.

SGH has an active surveillance programme that screens high-risk patients for *C. auris* and isolates those who test positive.

Other patients in the same ward or room are also screened as part of the hospital's strategy to contain its spread.

Dr Ko said: "*C. auris* is a really important pathogen that we always need to keep an eye on in our surveillance and in our studies.

"If it remains undetected, and it circulates in Singapore undetected, it will just pop up as an invasive infection and outbreak before we can even switch gears."

GIS scientists have developed a machine-learning technique to keep track and automatically detect new clades early.

Associate Professor Niranjan Nagarajan, associate director of genome architecture at GIS, said: "For a pathogen like *C. auris*, which is extensively studied, there are still opportunities for discovering something surprising and new. This emphasised that what we are doing at the level of genomics is still just the tip of the iceberg.

"The idea is that we have an artificial intelligence-based approach to identify strains that look like they come from a novel clade.

"This is meant to show a proof-of-concept that such strains can be automatically flagged in the future, though much more extensive testing is needed before it can be put into clinical practice."

It is particularly important for a regional hub like Singapore to monitor and identify emerging public health threats early, he said.

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