

Mounting a multi-layered attack on fungal infections

September 8 2009

Unravelling a microbe's multilayer defence mechanisms could lead to effective new treatments for potentially lethal fungal infections in cancer patients and others whose natural immunity is weakened.

Although not as well known as bacterial infections, such as MRSA and *E.coli*, fungal infections such as that caused by the yeast *Candida albicans* can be more serious and lead to a higher death rate. Using mutant forms of the *C. albicans* yeast which lacked different parts of the yeast cell wall, Professor Neil Gow and his colleagues have uncovered a three-pronged mechanism by which the body's immune defences attack the invading fungus.

Presenting the work at the Society for General Microbiology's meeting at Heriot-Watt University, Edinburgh, today (8 September), Professor Gow explained that the yeast's cell wall consists of a skeleton-like structure made up of complex sugars called chitins and glucans, covered by an outer layer of proteins which are highly decorated with sugars. The white blood cells that form part of the human [immune system](#) have receptors on their surfaces which recognise specific parts of the yeast cell wall, enabling them to fasten on to the invading yeast cells, kill them and then break them down. However other components in the yeast cell wall were found that can damp down this immune response.

In addition, the immune system needs to attack the glucans in the yeast inner cell wall. In the early stages of infection when the [white blood cells](#) start to digest the outer cell wall of the [yeast](#), the glucans become more

exposed; the immune system is then able to mount a chemical attack on these molecules.

"We need to find out exactly what the body's immune systems detect and what receptors the defence cells have that recognise the yeast's cell wall components. However, fungi are clever enough to develop evasion strategies - so we need to figure what these are too. If we can do this we may be able to stimulate the immune system to work more effectively in killing disease-causing fungi," said Professor Gow.

"In the longer term we may be able to treat patients with immunotherapy - with agents that stimulate their immunity - as well as with anti-microbial drugs. In addition our work may also lead to new ways to detect fungal infections earlier. Too often the fungus has taken a hold and established itself so well that treatment becomes even more difficult".

Source: Society for General Microbiology

Citation: Mounting a multi-layered attack on fungal infections (2009, September 8) retrieved 18 April 2024 from <https://phys.org/news/2009-09-mounting-multi-layered-fungal-infections.html>

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