

Scientist Working to Find Cure for Common Bloodstream Infection

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(PhysOrg.com) -- Bloodstream infections frequently occur and commonly cause death among critically ill patients. Scientists at the University of Maine may have unlocked the answer to treating one of these infections that kills more than 30 percent of the patients it infects.

"It's an important clinical problem," UMaine assistant professor of microbiology Robert Wheeler said.

For years, humans have lived with a fungus on our skin and in our gastrointestinal tracts that typically stays dormant.

It has developed a sort of camouflage that prevents the immune system from eliminating it, while at the same time the immune system is able to prevent the fungus from creating an infection.

It's what Wheeler calls an "evolutionary give-take relationship."

The fungus, *Candida albicans*, normally masks a special sugar in its protective coating that gives the cell rigidity but allows it to be attacked by the immune system.

The sugar is called β -Glucan. In response to the presence of the fungus, the human immune system has developed a receptor that is specific for β -Glucan and provides immunity for the fungi when it's activated. When that balance is disrupted and a person's immune system too weak to fight back, the fungus can be deadly.

"In healthy people, the only type of infection that Candida will cause is vaginitis," Wheeler explained. "It really only becomes dangerous when the fungus gets an entry into the body and your immune system is compromised in some way."

Those most susceptible include critically ill patients with intravenous lines puncturing their skin, cancer patients whose immune systems already are weakened, and those who have received organ transplants and are taking medications to prevent organ rejection.

In addition to being the fourth most common cause of bloodstream infection, Candida can cause vaginitis in healthy women, and thrush in newborns and AIDS patients.

A journal article detailing the research by Wheeler and colleagues at the Whitehead Institute for Biomedical Research recently was published by the Public Library of Science's "PLOS Pathogens." The article is titled "Dynamic, morphotype-specific *Candida albicans* β -glucan exposure during infection and drug treatment."

It explains how Wheeler and those working with him have discovered how *Candida albicans* may evade detection by the human immune system, and how infection progression and drug therapy can counteract that tactic. They are now working to develop a drug to remove the camouflage and unmask β -Glucan so the immune system will recognize and fight the infection.

"We want to use this information to develop new drugs in order to prevent the fungus from evading the immune system and thereby allow our immune system to fight the fungus better," Wheeler said. "We're in the process of identifying targets and screening for new drugs that can damage the fungus in such a way that now it's better recognized by the immune system."

Provided by University of Maine

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