

Breast cancer drug shows promise against serious infections

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An FDA-approved drug used for preventing recurrence of breast cancer shows promise in fighting life-threatening fungal infections common in immune-compromised patients, such as infants born prematurely and patients with cancer. Some scientists suspected that tamoxifen has antifungal properties; now new research from the University of Rochester Medical Center shows that it actually kills fungus cells and stops them from causing disease.

"It's still early, but if tamoxifen, or molecules like it, turns out to be an effective treatment against serious fungal infections, it'll be a welcome addition to our arsenal," said Damian Krysan, M.D., Ph.D., author of the research recently published in the journal *Antimicrobial Agents and Chemotherapy* and assistant professor of Pediatrics at the University of Rochester Medical Center .

While serious fungal infections are generally isolated to patients with cancer, patients in intensive care units, patients with HIV or patients taking immune-suppression medications for chronic conditions, they are among the deadliest infections. Fungus is the third most common cause of blood stream infection in premature infants in the neonatal intensive care unit. The survival rate for children with [acute lymphoblastic leukemia](#) is about 95 percent, but if they acquire a *Candida albicans* [fungal infection](#), that drops to 80 percent. [Bacterial meningitis](#) has a 5 percent risk of death, but the risk of death for *C. albicans* blood stream infection is 20 percent.

Tamoxifen is given to prevent breast cancer from returning. It is given orally, and often for months at a time. Scientists had known that tamoxifen has anti-fungal properties in test tubes, but it was Krysan and his team, including Melanie Wellington, M.D., Ph.D., assistant professor of Pediatrics, that found that it kills yeast in mice with Candida infections. This is a crucial step toward developing tamoxifen or structurally related molecules for use in patients. At high levels - about the same as those used, experimentally, to treat brain tumors - tamoxifen reduced yeast levels by 150 fold. In fact, the drug caused the fungus cells to break apart and die (lysis), and it didn't allow the surviving cells to morph into their disease-causing state.

In the past 20 years, only one new class of antifungal drugs has been introduced and they must be administered intravenously, not orally, which presents challenges in outpatient settings. The most widely used antifungal drug that can be given orally slows the growth of fungus cells but it doesn't kill them, which means that patients whose immune systems are compromised may have trouble completely fighting off the infections.

"We don't have vaccines against fungal infections and the few drugs we do have aren't always effective," Krysan said. "We've got a lot more work to do to figure out whether [tamoxifen](#) could be used in high doses or whether it could be used in combination with other treatments, but we're excited about the possibility of giving doctors another way to help these critically ill [patients](#)."

Source: University of Rochester Medical Center ([news](#) : [web](#))

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