

# Discovery of sexual mating in *Candida albicans* could provide insights into infections

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Like many fungi and one-celled organisms, *Candida albicans*, a normally harmless microbe that can turn deadly, has long been thought to reproduce without sexual mating. But a new study by Professor Judith Berman and colleagues at the University of Minnesota and Tel Aviv University shows that *C. albicans* is capable of sexual reproduction.

The finding, published online by *Nature* January 30, represents an important breakthrough in understanding how this pathogen has been shaped by evolution, which could suggest strategies for preventing and treating the often serious infections that it causes.

The most common fungus that infects humans, *C. albicans* is part of the large community of microorganisms that live for the most part harmlessly within the [human gut](#). But unlike many of its neighbors, this one-celled yeast can also cause disease, ranging from thrush (an [oral infection](#)) and vaginal yeast infections to systemic [blood infections](#) that cause [organ failure](#) and death and usually occur in people with immune defects related to HIV/AIDS, [organ transplantation](#) or chemotherapy. *C. albicans* is responsible for 400,000 deaths annually.

Most single-celled organisms reproduce by dividing, but others reproduce asexually, parasexually or via sexual mating. Scientists have long believed that *C. albicans* reproduce without mating.

Organisms that produce asexually or parasexually are diploid, which means they have two sets of chromosomes and thus can reproduce without a mate. Organisms that reproduce sexually are haploid, which means they have one set of chromosomes and need a mate to provide a second set. *C. albicans* was believed to be diploid, but this study shows that the yeast is sometimes haploid, and that these haploids are capable of [sexual reproduction](#).

Sexual reproduction fuels the evolution of higher organisms because it combines DNA from two parents to create one organism. The haploid isolates discovered in Professor Berman's lab arise only rarely within a population, and have been detected following propagation in the lab or in a mammalian host. These haploids can mate with other haploids to generate diploid strains with new combinations of DNA, which may provide the diversity required for fungus to evolve.

The haploid *C. albicans* isolates also pave the way for genetic studies of the pathogen, such as the construction of "libraries" of recessive mutant strains. In addition, the ability to perform genetic crosses between haploids will help produce modified diploid strains that should help scientists better understand interactions between the fungus and its host and how it transforms from a harmless microbe into a deadly pathogen.

Provided by University of Minnesota

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