Department of Molecular and Cellular Biology

Graduate Seminar MCB*6500

Friday, March 5, 2021 @12:45 p.m.

presented by:

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(Advisor: Dr. Rebecca Shapiro)

"A comprehensive analysis of the role of the DNA damage response in *Candida albicans*"

Candida albicans is a commensal fungal organism that exists naturally on human skin and mucosal surfaces. Despite its ability to exist harmlessly in human hosts, it is also considered an opportunistic pathogen and can cause severe and life-threatening disease in immunocompromised individuals. It is the fourth most common cause for nosocomial bloodstream infections and is the leading cause for deaths associated with invasive fungal infections. *C. albicans* is a successful pathogen due to a number of virulence mechanisms, and the lack of effective antifungal therapies coupled with the rising incidence of antifungal drug resistance has established this organism as a significant threat to human health. Advancements in gene editing technologies, such as CRISPR, have provided efficient means by which *C. albicans* can be studied to help identify novel antifungal drug targets and explore possible avenues for slowing antifungal drug resistance. In bacteria, there is a well-established phenomenon linking treatment with antibiotics to increased rates of mutagenesis and drug resistance, mediated by error-prone polymerases. The polymerases are upregulated upon stress-induced DNA damage and facilitate rapid DNA repair while introducing mutations into the genome, ultimately driving drug resistance. This effect has also been identified in the model yeast organism *Saccharomyces cerevisiae* but has yet to be characterized in pathogenic fungi such as *C. albicans*. This study aims to identify genes encoding error-prone polymerase based on known orthologs in *S. cerevisiae* to determine their role in the DNA damage response pathway, and in mediating mutagenesis-based antifungal drug resistance.