Department of Molecular and Cellular Biology

Graduate Seminar MCB*7500

Friday, April 5th, 2024 @ 12:00 p.m.

presented by:

Mayara Barbara Da Silva

(Advisors: Dr. Jennifer Geddes-McAlister and Dr. Arnaud Droit)

"Development of a novel platform for assessment of interactions driving infection between *Cryptococcus neoformans* and macrophages"

Cryptococcus neoformans is the primary etiological agent of cryptococcosis, a mycosis that accounts for approx. 112,000 deaths in people living with HIV. Macrophages are the primary immune cells responsible for fungal clearance; however, *C. neoformans* possesses evasion mechanisms that increase fungal survival and disease development. This dynamic interaction highlights the importance of macrophages during cryptococcal infection, but the underlying mechanisms are not fully understood. Accordingly, protein-protein interactions (PPIs) are fundamental in the host-pathogen interaction and can help elucidate the underlying mechanisms involved in pathogenesis and immunological defence. Studies investigating the interactions between *C. neoformans* and macrophages are typically performed on single proteins or focus on only one of the biological systems, underexploring the potential changes occurring during disease. Therefore, I hypothesize that, by globally assessing PPIs, I will detect and quantify an increased number of interacting proteins between the pathogen and the host, as well as within each biological system during infection. Moreover, the interactions between fungal and macrophage cells drive disease progression. To test this hypothesis, I will develop a novel platform combining size exclusion chromatography and mass spectrometry to define interacting proteins from an *in vitro* infection model. PPIs will be further validated using co-immunoprecipitation and Förster resonance energy transfer approaches. As a result, new interactions driving disease may be uncovered, supporting the discovery of novel proteins crucial to infection, which may represent new targets for antifungal agents.