Department of Molecular and Cellular Biology

Graduate Seminar MCB*6500

Friday, January 26, 2024 @12:45 p.m.

presented by:

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"A high throughput in vitro motility assay for screening of cardiomyopathy therapeutics"

Cardiovascular diseases are the leading cause of deaths globally, accounting for 32% of mortalities and posing an immense economic burden of $21.2 billion annually in Canada alone. Among these is a disease of the ventricular myocardium known as cardiomyopathy, predominantly appearing as hypertrophic or dilated cardiomyopathy, whose development is often linked to genetic mutations in genes encoding sarcomere proteins. Current treatments for hypertrophic cardiomyopathy target symptom relief and have limitations in treatment efficacy, along with many negative side effects. The in vitro motility assay is a widely employed assay used for studying disease development in cardiomyopathies, as well as novel medications capable of targeting disease mechanism. While this assay has the ability to assess the force and calcium sensitivity of contraction in sarcomere proteins, the assay faces challenges in lengthy data acquisition and analysis and is therefore considered low throughput. To address the bottleneck in cardiomyopathy drug development, this project aims to adapt the in vitro motility assay to a high-throughput assay with automated data collection and analysis. With a successful automated assay, it is possible to expedite characterization of variant sarcomere proteins linked to this disease and identify potential therapeutic compounds targeting hypertrophic and dilated cardiomyopathies' molecular disease mechanism, a crucial step towards eliminating the burden of this disease.