



**COLLEGE of  
BIOLOGICAL SCIENCE**

DEPARTMENT OF MOLECULAR  
AND CELLULAR BIOLOGY

***Announcement:***

*All interested members of the university community are invited to attend  
the Final Oral Examination for the degree of **Master of Science** of*

**LAYLA ALIBABAI**

**on Wednesday, January 13, 2021 at 1:30 p.m. (online)**

**Thesis Title:** **STIP1 a novel SNARE complex interactor, and its role in tumour cell migration and invasion**

**Examination Committee:**

Dr. Mike Emes, Dept. of Molecular and Cellular Biology (Exam Chair)  
Dr. Marc Coppolino, Dept. of Molecular and Cellular Biology  
Dr. Melissa Perreault, Dept. of Molecular and Cellular Biology  
Dr. Shaun Sanders, Dept. of Molecular and Cellular Biology

**Advisory Committee:**

Dr. M. Coppolino (Adv.)  
Dr. M. Perreault  
Dr. D. Josephy

**Abstract:** Cancer cell invasion often involves the formation of invadopodia, filamentous-actin rich membrane protrusions, that mediate the degradation of the extracellular matrix (ECM). ECM degradation is accomplished via the targeted secretion of matrix metalloproteinases (MMPs), primarily Membrane-Type 1 Matrix Metalloproteinase (MT1-MMP). Previous studies have identified that the delivery of MT1-MMP to invadopodia in MDA-MB-231 cells involves a soluble N-ethylmaleimide sensitive factor attachment protein receptor (SNARE) complex, comprising Syntaxin 4 (Stx4), Synaptosomal-associated protein 23 (SNAP-23), and vesicle-associated membrane protein 2 (VAMP2). Although SNARE-mediated fusion events are highly regulated, it remains unclear what specific mechanisms are responsible for regulating SNARE activity and complex assembly during invadopodia formation and tumour cell invasion. This thesis describes studies, using mass-spectrometry-based proteomics and biochemical approaches, of the novel association of Stress-induced phosphoprotein 1 (STIP1) with the Stx4-SNAP23-VAMP2 complex. CRISPR/Cas9-mediated knockdown of STIP1 perturbs tumour cell migration and invasion. Taken together, these results indicate that STIP1 associates with the SNAP23 SNARE complex and facilitates tumour cell migration and invasion.

**Curriculum Vitae:** Layla completed her Bachelor of Arts and Science (Hons.) at the University of Guelph in the spring of 2018, and then began her MSc in the lab of Dr. Marc Coppolino in the fall of the same year.