UNIVERSITY of GUELPH

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*

SAMANTHA BATTAGIN

On Wednesday, January 17, 2024 at 1:30 p.m. (online)

Thesis Title: **Analysis of Stx4-Munc18c Interaction and Membrane-Type 1 Matrix Metalloproteinase Phosphorylation During Invadopodium-Based Cell Invasion**

Examination Committee:

Dr. Shaun Sanders, Dept. of Molecular and Cellular Biology (Exam Chair)
Dr. Marc Coppolino. of Molecular and Cellular Biology
Dr. Nina Jones, Dept. of Molecular and Cellular Biology
Dr. Andrew Bendall, Dept. of Molecular and Cellular Biology

Advisory Committee:

Dr. Marc Coppolino (Advisor)
Dr. Nina Jones
Dr. Wei Zhang

Abstract: Membrane-type 1 matrix metalloproteinase (MT1-MMP) plays a central role during invadopodium-based ECM degradation and subsequent cancer cell invasion through its proteolytic ability and as a signal transducer. Regulation of MT1-MMP function is not well understood but would provide better insight on the role of MT1-MMP and how it can be targeted to impair cell invasion in metastatic cancers.

Previous research in our lab provides evidence that disrupting SNARE activity, by competitively inhibiting Syntaxin4 (Stx4) interaction with its regulatory protein Munc18c, impairs MT1-MMP trafficking and subsequently cell invasion. Previous research also reveals a potential role of MT1-MMP phosphorylation at Thr567 in the activation of ERK signalling as a mechanism to upregulate cell invasion in cancer cells.

The goal of this study was to expand the analysis of Stx4 and Munc18c interaction across different breast cancer cell lines and tumour tissues, and to determine if ERK activation is mediated by MT1-MMP phosphorylation at Thr567 during invasion in breast cancer cells. Results of this study confirm the regulatory interaction between Stx4 and Munc18c has potential as a target for impairing MT1-MMP-mediated cell invasion and provides positive compelling evidence suggesting MT1-MMP plays a role in ERK activation during cell invasion. This research provides validation for further analysis of these cellular mechanisms involved in regulating MT1-MMP-mediated cell invasion.

Curriculum Vitae: Samantha completed her Bachelor of Science (Honours) in Molecular Biology and Genetics at the University of Guelph in 2020. She began her Master of Science program in Molecular and Cellular Biology at the University of Guelph in Dr. Coppolino's lab in 2021.