University of Victoria | Graduate Studies

Notice of the Final Oral Examination
for the Degree of Master of Science

of

TEESHA LUEHR

BSc Honours (University of British Columbia, 2015)

"Multiplexed Matrix-Assisted Laser Desorption/Ionization-Mass Spectrometry Imaging (MALDI-MSI) Biomarker Discovery"

Department of Biochemistry and Microbiology

Wednesday, December 13, 2017
9:00 A.M.
Clearihue Building
Room B017

Supervisory Committee:
Dr. Christoph Borchers, Department of Biochemistry and Microbiology, University of Victoria (Supervisor)
Dr. Caren Helbing, Department of Biochemistry and Microbiology, UVic (Member)
Dr. Ben Koop, Department of Biology, UVic (Outside Member)

External Examiner:
Dr. Fraser Hoff, Department of Chemistry, UVic

Chair of Oral Examination:
Dr. Jen Baggs, School of Business, UVic

Dr. David Capson, Dean, Faculty of Graduate Studies

Abstract

The work presented herein represents an overarching premise of biomolecule detection and identification using Matrix-Assisted Laser Desorption/Ionization-Mass Spectrometry Imaging (MALDI-MSI). MALDI-MSI is a unique form of mass spectrometry that is highly multiplexed; it can simultaneously retain location information of the mass of multiple ions, allowing for correlation of morphology or pathology to reconstructed ion heat maps. MALDI-MSI is a relatively young field with little standardization of novel methods. The main theme of the research of this thesis was to create an optimized sample preparation protocol and data processing workflow. The three sets of samples and data analysis include: 1) a proteomic MALDI-MSI optimization and analysis of prostate cancer for biomarker discovery; 2) the optimization of a metabolomic MALDI-MSI data analysis of tadpoles to gain insights into the effects of thyroid hormone on metamorphosis; and 3) an optimization of a metabolomic MALDI-MSI analysis of colorectal liver metastasis for biomarker discovery.