



**University
of Victoria**

Graduate Studies

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

of

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BSc. Hons (University of Victoria, 2014)

**“Acute Neurobehavioural Changes Following Repeat
Mild Traumatic Brain Injury”**

Division of Medical Sciences

Wednesday, April 12, 2017
12:00 P.M.
Medical Sciences Building
Room 210

Supervisory Committee:

Dr. Brian Christie, Division of Medical Sciences, University of Victoria (Supervisor)
Dr. Leigh Anne Swayne, Division of Medical Sciences, UVic (Member)
Dr. Bob Chow, Department of Biology, UVic (Outside Member)

External Examiner:

Dr. Stephanie Willerth, Department of Mechanical Engineering, UVic

Chair of Oral Examination:

Dr. Richard Keeler, Department of Physics and Astronomy, UVic

Dr. David Capson, Dean, Faculty of Graduate Studies

Abstract

There is increasing evidence that repeat mild traumatic brain injury (rmTBI) may result in cumulative and long-term symptoms, more pronounced behavioural deficits, and neurodegeneration. Children have a greater susceptibility to head injury and represent a significant at risk population for rmTBI, especially those that participate in contact sports. Despite this, there is a paucity of data on rmTBI pathophysiology in the juvenile brain. The current study utilizes an awake close head injury (ACHI) model to deliver repeat injuries to fully conscious juvenile rats. The ACHI model avoids the potential confounds of anaesthesia, and facilitates the assessment of neurological function immediately after each impact. Results indicate that the ACHI model produces acute neurological deficits after each injury, and that repeat injury worsens outcomes. Behavioural testing identified transient anxiety-like behaviour and motor impairments in response to rmTBI. Functional impairments and affective behaviour were in the absence of tau protein pathology. This study represents the first investigation of the consequences of rmTBI on the juvenile brain using an awake model of brain injury.