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

of

HANNAH WESTLAKE

BSc (University of Victoria, 2012)

“A Comparative Immunohistochemical Study of the Neuromuscular Organization of Haliclystus ‘sanjuanensis’ and Manania handi (Cnidaria: Staurozoa)”

Department of Biology

Thursday, December 10, 2015
10:00 A.M.
Hickman Building
Room 120

Supervisory Committee:
Dr. Louise Page, Department of Biology, University of Victoria (Supervisor)
Dr. Bob Chow, Department of Biology, UVic (Member)
Dr. John Taylor, Department of Biology, UVic (Member)
Dr. Rana El-Sabaawi, Department of Biology, UVic (Additional Member)

External Examiner:
Dr. Sally Leys, Department of Biological Sciences, University of Alberta

Chair of Oral Examination:
Dr. Mark Gillen, Faculty of Law, UVic

Dr. David Capson, Dean, Faculty of Graduate Studies
Abstract
Recent molecular evidence shows that staurozoans are medusozoans that diverged from the common ancestor of Medusozoa prior to the innovation of the swimming medusa stage. Staurozoans are thus best interpreted as having precursors of medusa morphology rather than remnants of it. To clarify and increase the utility of this finding, I studied the neuromuscular morphology of two staurozoans, *Haliclystus ‘sanjuanensis’* and *Manania handi* using FMRFamide and α-tubulin antibodies to label neurons, and fluorophore-tagged phalloidin to label muscles. My results indicate that similar to anthozoan and medusozoan polyps, *H. ‘sanjuanensis’* and *M. handi* possess a single regionally differentiated FMRFamide and α-tubulin immunoreactive (IR) nerve net with exumbrellar, subumbrellar and gastrodermal components, and muscles composed of smooth muscle fibers only. Results are consistent with a pre-medusa origin of Staurozoa and indicate that the common ancestor of Medusozoa may have had a marginal circular muscle and a muscular manubrium, but did not possess the multiple parallel conducting nerve nets, striated muscle, or pacemaker required to coordinate swimming behaviour in medusae. A possibly light-sensitive concentration of neurons at the base of the primary tentacles supports the hypothesis that modified staurozoan primary tentacles and medusozoan rhopalia are homologous. The unique neuromuculature of staurozoan nematocyst clusters suggests they perform a defensive or predatory function and may be a synapomorphy of Staurozoa.