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BSc Honours (Psychology), Queen’s University, 2005  
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DEPARTMENT OF PSYCHOLOGY & NEUROSCIENCE

TITLE OF THESIS:  
SEX, STRESS AND HORMONES: INVESTIGATING THE ROLE OF THE EARLY ENVIRONMENT IN SHAPING BRAIN AND BEHAVIOUR CHANGES LINKED TO NEUROPSYCHIATRIC DISORDERS

TIME/DATE:  
2:00pm, Thursday, February 11, 2016

PLACE:  
Room 3107, The Mona Campbell Building, 1459 LeMarchant Street

EXAMINING COMMITTEE:  
Dr. Anthony Auger, Department of Psychology, University of Wisconsin - Madison (External Examiner)  
Dr. Younes Anini, Department of Physiology & Biophysics, Dalhousie University (Reader)  
Dr. Leslie Phillmore, Department of Psychology & Neuroscience, Dalhousie University (Reader)  
Dr. Tara Perrot, Department of Psychology & Neuroscience, Dalhousie University (Supervisor)

DEPARTMENTAL REPRESENTATIVE:  
Dr. Ian Weaver, Department of Psychology & Neuroscience, Dalhousie University

CHAIR:  
Dr. Norman Schepp, PhD Defence Panel, Faculty of Graduate Studies

ABSTRACT
Vulnerability to anxiety and depression are linked with both sex differences and early life stress. Though human studies suggest that childhood symptoms and neurophysiological markers may predict some adult neuropsychiatric disorders, few animal models examine early developmental time-points when studying effects of stress and/or sex differences, especially as forecasters of later disease. In this thesis, effects of an ethologically relevant model of prenatal predator stress (PPS), with/without postnatal enhanced housing (EHC) was explored in a rat model of anxiety/depression. First, behavioural changes following PPS/EHC were quantified in both juvenile and adult rats on tasks modeling anxiety and depression. Adult males exposed to PPS demonstrated increased anxiety and some disrupted social behaviours, which were partially rescued by EHC. Following PPS, adult females exhibited anhedonia that was prevented by EHC. Effects of EHC were more prominent in juveniles, while many effects of PPS emerged in adulthood. Juvenile behaviours did not correlate directly with equivalent adult behaviours, but some juvenile behaviours predicted other adult anxious/depressive behaviours. In subsequent studies, changes in an epigenetic marker (DNMT3a) or a GABA marker (GAD67) were quantified in the brains of juveniles exposed to either the PPS/EHC paradigm, to examine its role in disrupting early development, or to postnatal androgens, to examine the role of organizational hormones in establishing sex differences at this time. In both males and females, PPS acted primarily to increase DNMT3a-ir, though there were sex differences in which regions were affected, and whether EHC could ‘rescue’ these changes. Sex differences in DNMT3a-ir were found in some brain regions, and androgens partially mediated these differences. Effects of PPS on GAD67-ir were dependent on sex, decreasing GAD67-ir in males and increasing it in females, in different brain regions. Though EHC prevented/rescued many of these changes, it also independently altered GAD67-ir in several regions in females. Sex differences in GAD67-ir were primarily found in the amygdala, with a complex role for organizational androgens in establishing these differences. Together, these studies demonstrate sex-specific changes in both brain and behaviour at an early developmental time point, which may predict some adult vulnerabilities to anxiety and depressive behaviours.