

# DEPARTMENT OF PSYCHOLOGY COLLOQUIUM

## JOHN P. ZUBEK MEMORIAL LECTURE



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**Friday, March 10<sup>th</sup> 2023, 3:00pm, P412 Duff Roblin**  
Wine & Cheese to follow talk

### **GAME OF HORMONES: WHY SEX AND SEX HORMONES MATTER FOR BRAIN HEALTH**

**Introduction/Aim:** As anyone who has gone through adolescence, pregnancy, or aging can attest: hormones can exert powerful effects on brain and behaviour. My laboratory has focussed primarily on three main areas of research: how sex, sex and stress hormones affect neuroplasticity, cognition and emotional behaviours. Why do I study sex differences in cognition? I'll give you a hint: it's not so Google employees can write manifestos. Men and women differ in their vulnerability to develop neurodegenerative and psychiatric diseases, many of which are also associated with sex differences in the severity of cognitive disruptions and neural manifestations of the disease. For example, women have a greater lifetime risk of Alzheimer's disease (AD) and major depressive disorder and also greater cognitive disruption with both these diseases compared to men. However, men are more likely to present with greater cognitive disturbances with schizophrenia. Hence, to gain a better understanding of how to effectively treat cognitive symptoms in both men and women, it is important to acknowledge and study differences that might arise between both sexes in response to environmental perturbations. The hippocampus produces new neurons throughout the lifespan in rodents and humans and adult neurogenesis plays a crucial role for pattern separation, which is a process involved in episodic memory.

#### **Methods/Results:**

I will show different examples of sex differences in hippocampal neurogenesis under basal conditions but also in response to sex hormones and to spatial training. It is important to establish how neurogenesis in the hippocampus may be involved in hippocampus-dependent cognition in both males and females given the sex differences in cognitive disruptions following diseases that impact the hippocampus. Work in my laboratory has shown that there are sex differences in performance favoring males or females depending on the task and strategy use as well as in neurogenesis after spatial navigation and pattern separation. We also see multiple examples of sex differences in neurogenesis and functional connectivity that imply differential mechanisms are at play with pattern separation. Finally, I will speak briefly, on preliminary evidence on sex differences in hippocampal neurogenesis using a rodent model of Alzheimer's disease and how, a uniquely female event, motherhood, can have long lasting effects on the hippocampus and cognition.

**Conclusions:** These findings emphasize the importance of studying biological sex on hippocampal function and neuroplasticity and have implications for neurodegenerative and psychiatric disorders that target the hippocampus and affect cognition differentially in women versus men.



**EVERYONE WELCOME!**



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of Manitoba**