

## Research Colloquium 2021 Abstract

Title: Sex differences in stress reactivity and responses to novelty in the gray short-tailed opossum (*Monodelphis domestica*)

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Introduction: Investigating how exposures to stress and novel environments influence behavior is important for translational research that aims to improve mental health.

Previous studies have focused on reactions to novelty and revealed changes in defense reactions and exploratory behavior. (Pisula et al., 2012).

Objective: The focus of the present study is to investigate sex differences in behavioral responses to novel environments and restraint stress in the gray short-tailed opossums (*Monodelphis domestica*). Using the *Monodelphis* is innovative because it is a non-traditional animal model that is ideal for developmental research.

Methods: Using AnyMaze video tracking software, animals' behaviors (6 males, 6 females) in the restraint stress task (3 min) and open field task (10 min) were recorded. AnyMaze and JWatcher were used to quantify movements, both locomotor and non-locomotor, and finally the data collected analyzed using SPSS. Restraint was used to inflict stress in the subjects, and the reactions were movements in paw, tail, and head. Reactions to a novel environment were assessed via exploratory and locomotor behaviors in an open field.

Results: The results of a t-test revealed that the movement of the head was significantly different between sexes when considering  $p < 0.05$  cutoff, with the female showing higher reactivity than their male counterparts ( $t(10) = 2.278, p < 0.05$ ). There were no sex differences in the other behaviors. To further compare the results, an open field paradigm was used, where subjects were introduced to a new environment and their reactions were reviewed. Our preliminary observations indicate that males were more prone to vast exploration of the new environment and at a faster pace, while females exhibit slower movements and limited exploration, mainly focusing in the areas closer to the walls.

Discussion: We are currently conducting additional experiments with more subjects to determine if the behavior exhibited by females are a consequence of them feeling stressed by the novelty of the environment. If the results favor our hypothesis, then we could conclude that females are more susceptible to experiencing stress. To further analyze the data collected from both experiments, we are taking into consideration the age of the subjects, as considering this variable can help understand their behavior and stress reactivity at different stages of life.

Conclusions: Clinical and epidemiological research have identified major gender/sex differences in neuropsychiatric disorders, and stress is a major contributor to mental health problems. Our results support the hypothesis that sex differences in stress reactivity and responses to novelty are present in *Monodelphis*, suggesting that sex differences have a biological component and that animal models can be used to study mechanisms that underlie sex differences in stress responses.

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References:

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