Title: Sex differences in stress reactivity, brain morphology, and oxytocin in the hypothalamus of the gray short-tailed opossum (*Monodelphis domestica*).

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Understanding the effects of stress on behavior and cognition is important due to its impact on mental health and wellbeing (Schneiderman et al. 2005). Translational animal research can contribute to the development of new treatments that can improve therapeutic outcomes and our understanding of the neurobiology of stress. In the present study, we complement behavioral stress reactivity with immunohistochemical localization of oxytocin in the hypothalamus, a neuropeptide that regulates stress (Neumann & Slattery, 2016). Oxytocin has potential therapeutic use for mental health disorders (Neumann & Slattery, 2016), and the effects of oxytocin seem to be sexually dimorphic (Love, 2018). Using the *Monodelphis Domestica*, we examined biological sex differences in brain and behavior and hypothesized that there would be sexually dimorphic expression of oxytocin in the hypothalamus of the *Monodelphis* brain.

Open field tests were used to investigate stress in the *Monodelphis* (4 females, 4 males), their exploratory behavior was recorded and quantified using AnyMaze software, and data were analyzed with SPSS software. Immunohistochemistry was used to study oxytocin expression in the paraventricular nucleus (PVN) of the hypothalamus and the supraoptic nucleus (SON) (Love, 2018).

Preliminary results indicate that there is a sex difference in stress reactivity in the *Monodelphis Domestica*; females exhibit higher mobility duration than males. The preliminary results from our pilot immunohistochemistry study demonstrated that oxytocin expression is present in both the PVN and SON areas. Future studies will explore sexual dimorphisms in this species, including sex differences in the expression of oxytocin in the *Monodelphis* brain.

In conclusion, the present study contributes to our understanding of stress in the *Monodelphis*, and we observed that oxytocin expression in the *Monodelphis* model is not as extensive as it is in rodents. Findings will contribute to treatment research, which can improve therapeutic outcomes for individuals with stress-related mental disorders.