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MA or PhD Student: Master's

Department: Psychology

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Proposal Title

Sex differences in the neural circuits that predict alcohol dependence development

Proposal Description

My research is investigating how alcohol dependence might alter neural circuitry in male and female rats. Up until very recently, females and women have been historically excluded from preclinical research. This has extensive ramifications including misdiagnosis and late diagnosis in biological female patients due to males being considered the "default." Previous research has shown that brain regions important for decision making (prefrontal cortex) and reward (nucleus accumbens shell) play a major role in male alcohol consumption behavior, but not in females. To quantify the activity of brain regions, I created and implanted electrodes which collect local field potentials, an aggregate of electrical information, from desired brain regions. The impressive aspect of this technique is that it allowed for collecting neural data from these brain regions in awake, freely behaving animals. Specifically, during the behavior of self-administering alcohol. This current project not only collected neural oscillations from the previously described prefrontal cortex and nucleus accumbens shell but included an area important for mediating stress (central nucleus of the amygdala), which aligns with subjective reporting that women are more susceptible to stress-induced relapse in alcohol use disorder. My preliminary analysis shows that the central nucleus of the amygdala does indeed mediate alcohol consumption in female animals.

My abstract has been accepted for a poster presentation at the 2024 Winter Conference on Brain Research will be held in Breckinridge, Colorado from January 27 - February 1, 2024. Funding from the travel grant will be used to cover registration costs ($300 for a student presenter) and then applied to travel costs (flights from Spokane into Denver are currently around $200). Any funds leftover would be applied to lodging at the conference hotel, split between three graduate-level attendees.

One way to meet the annual professional development requirements for the Experimental Psychology Ph.D. program is presenting research at a non-WSU conference a minimum of twice a year. As the first graduate student in a young lab, our funding only has the bandwidth to cover one conference registration per year. I have previously attended the Research Society on Alcohol annual meeting which focuses more on the clinical applications of our studies. This Winter Conference on Brain Research has a preclinical focus and attendees who use a wide variety of techniques in their neuroscience research,

including collaborators who use similar techniques of collecting neural data. Our data analysis includes a novel machine learning paradigm using the local field potential data. I would like the opportunity to connect with others who use similar techniques to inform my dissertation project. Getting the opportunity to disseminate my research to this different audience will help with my science communication skills and also feature WSU at a conference it is not normally represented at.

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