Name: Carlos Novoa
PI Name: Thomas Gould
Email: cmn5622@psu.edu
PI Email: tug70@psu.edu

Genetic Background Modulates Anxiety-Related Behaviors and the Impact of Adolescent Social Stress on Acute Responses to Nicotine in BXD Mice

Carlos Novoa, Thomas Gould

Department of Biobehavioral Health, College of Health and Human Development, Penn State Neuroscience Institute at University Park, The Pennsylvania State University

Adolescence is characterized by the maturation of neural circuits involved in higher-order cognitive, emotional, and volitional processes, which provides a critical window for adapting complex behaviors to changing environmental demands. This window of plasticity enables organisms to adjust complex behavioral systems to the characteristics of their environment. It also makes individuals susceptible to both beneficial and detrimental outcomes due to environmental exposures. Social stressors are a significant contributor to negative psychiatric outcomes during adolescence and later in life. We examined the influence of adolescent social stress on anxiety-related behaviors and sensitivity to acute nicotine exposure in later adolescence. We used male and female mice from a set of BXD strains to establish the role of sex and genetic background in moderating the interactions between juvenile stress and drug exposures and explore the underlying biological mechanisms leading to mental health-related outcomes. We observed marked strain differences in the spontaneous exploration of the elevated plus maze (EPM) and locomotion in the open field after acute nicotine exposure, where mice show a biphasic hypolocomotor response. Furthermore, we observed that exposure to social instability stress increased activity in the EPM and modified the nicotine-induced locomotor response profile depending on the strain and phase of the response. Currently, we are examining if sex differences are observed. These results highlight the influence of genetic factors on mental-health-related phenotypes and drug susceptibility during adolescence. Undergoing bioinformatic analyses will exploit publicly available data from the BXD mouse family to deepen the potential biological mechanisms underlying the current results.