

The Summer Undergraduate Research Fellowship (SURF) Symposium
6 August 2015
Purdue University, West Lafayette, Indiana, USA

Behavioral Outputs of Fragile-X Autistic Mice Exposed to Open-Field, Randomized, Short-Term Visual Stimuli

Nicholas M. DiCola, Alexander A. Chubykin
Department of Biology, Purdue University

ABSTRACT

Animal models of different neurological disorders are required for studying the pathophysiology of these diseases, and for potential development of pharmacological and behavioral treatments. The scientific community often uses mouse models for behavior studies due to their powerful genetic tools and low cost. However, subjective measurement techniques are often used when analyzing mice for behavioral traits which often results in discrepancies in results. An automated tracking software would aim to eliminate these discrepancies and subjective analysis. This lab has developed a software program which offered an ability to automatically collect open-field behavioral data with simultaneous on-line analysis. Python, an open sourced programming language, and OpenCV, an open sourced computer vision library, were used to create this novel tracking software. Wild type and transgenic Fragile-X mice were put into an open field environment and allowed to freely interact with it. Relative positioning and cross sectional area of a mouse were automatically tracked and quantified. In addition, an open-field visual stimulation paradigm was used, which is intended to be used to test visual perception, visual learning, and behavior in mice. A statistically significant difference was found between the transgenic and wild type mice in how they respond to both novel and habituated stimulation. The transgenic mice reacted for a longer period of time after novel stimulation with no decrease in response over the 45 minutes of trials while wild type mice stopped responding immediately after stimulation ended and have a decreased response over time. The most likely cause of these responses is a difficulty learning in fragile-X mouse models as well as longer firing time for their neurons.

KEYWORDS

Fragile-X, Autism, Open-Field, Behavior