Evaluating Differences in Cognitive Function after N-Acetyl-Cysteine Treatment in a Two-Hit Rat Model of Schizophrenia

Nadalie K.J. Cayetano[1], Sarine .S. Janetsian[1], Christopher .C. Lapish[1,2,3]
[1]Department of Psychology, Indiana University-Purdue University Indianapolis;[2]Stark Neuroscience Research Institute;[3]Institute for Mathematical Modeling and Computational Sciences, Indiana University School of Medicine

Schizophrenia (SZ) is a chronic mental disorder characterized by positive and negative symptoms both of which impair normal functioning. Effective treatment options for negative and cognitive symptoms are non-existent. Identifying translational biomarkers that can be applied across species could aid drug development. Remediation of cognitive impairments will be assessed after administering N-Acetyl-Cysteine (NAC) by the use of validated measures of cognitive performance in a “two-hit” model of SZ. Pups of Sprague Dawley dams were used. Each litter was split into two groups: maternally deprived (MD) or sham. The MD group (n= 9) were weighed and removed from their mothers for 24 hours on post-natal day 9. MD acts as an early-life stressor and may be linked with the development of SZ. The sham group (n= 9) served as controls. On post-natal day 75-88, MD rats (n= 9) received an injection of NAC (90.0 mg/kg; n= 5) or saline (n= 4). All sham rats received saline. Two days after NAC treatment, all rats received an acute injection of Phencyclidine (PCP) at 2.0 mg/kg, an N-Methyl-D-Aspartate antagonist. PCP alters glutamatergic signaling and is the second model used to induce SZ. The day after injection, short-term memory was assessed using temporal order and novel object recognition tasks. The same tasks were given to assess alterations of glutamatergic signaling after receiving chronic 2.0 mg/kg of PCP injections for six days. Preliminary results indicate no detectable differences in temporal order and novel object recognition tasks between the MD groups who received NAC from those who received saline. No significant differences were found between the MD and sham groups that received saline. Furthermore, there were no differences between any of the groups after chronic PCP administration. Additional animals are being tested to increase group sizes and to have larger power when running the analyses.

Mentors: Christopher C. Lapish and Sarine S. Janetsian, Department of Psychology, Indiana University-Purdue University Indianapolis