Physical Activity and Intranasal Administration of Neuropeptide Y and Y1 Agonists Mitigate the Symptoms of ADHD and PTSD

Forman, Matthew

Lepkowski, Jack

ADHD affects more than one in ten adolescents in the United States. Additionally, neuropeptide Y (NPY), a neurotransmitter that regulates stress and emotional behavior, is strongly associated with symptoms of post-traumatic stress disorder (PTSD). NPY expression has also been found to be affected by Physical Activity (PA) and is associated with dopamine utilization affecting those with ADHD. Therefore, this study examined if exercise can reduce ADHD symptomology and if the intranasal administration of NPY and Y1 agonists can reduce stress. We investigated the effects of exercise on ADHD and how NPY expression indirectly influences ADHD and PTSD symptomology. This observational component of the study also examined PTSD symptomology. Anxiety related behavior data analysis indicated that the control and post-infused NPY, and Y1H animals expressed significantly less anxious behaviors compared to the post-infused Vehicle animals ($p<.05$); depressive related behavior data analysis indicated that the control animals expressed significantly less depressive-like behavior compared to that of the post-infused NPY, Y1 and Vehicle animals ($p<.001$). It was also found that mean reaction times, an indicator of ADHD symptomology, of participants with ADHD following PA decreased by 22.5 ms when compared to reaction times prior to PA ($p<.05$); this was accompanied by a 14.7% increase in accuracy ($p<.001$), indicating an improvement in hyperactivity. Participants without ADHD displayed a mean reaction time decrease by 41.6 ms ($p<.05$) following PA and 3.1% increase in accuracy ($p<.001$). Therefore, results suggest that Physical Activity can reduce ADHD symptomology and that NPY administration can alleviate PTSD severity.

Awards Won:

National Institute on Drug Abuse, National Institutes of Health &amp the Friends of NIDA: First Award of $3,000