A MOTHS MEMORY: THE EFFECTS OF OCTOPAMINE ON MEMORY ACQUISITION AND RETENTION IN HELIOTHIS VIRESCENS

Chiddenton, Kathleen, Dr Kirk Hillier
Department of Biology, Acadia University, Wolfville, NS

Octopamine (OA) is an important chemical in invertebrates acting similarly to epinephrine and norepinephrine in vertebrates. OA has an important behavioural role in motivation, sensory sensitivity, as well as in reinforcement of learned behaviours. The purpose of this study was to determine the effects of OA on learning and memory as well as testing the importance of physiological state in relation to recall through a learning assay, the proboscis extension reflex (PER). Comparisons of learning ability with and without OA injections were made in Heliothis virescens. Moths were trained in 8 conditioning trials and their memory was tested both 45 minutes and 24 hours post-training. During conditioning and recall, moths were placed in front of an air flow and when odour was released, their antennae were stimulated with a drop of sugar water and they were fed briefly. During memory recall trials, sugar water stimulus was not used. Those that performed PER towards odour without antennal stimulation were considered to have learned the association between the odour and the sugar water reward. It was found that OA had a significant impact on PER percentage in moths both during training trials as well as during initial recall at 45 minutes. During 24 hour recall, the memory significantly decreased, however moths injected with a second dose of OA showed increased memory. This provides evidence for the importance of state dependant learning in memory recall and is a critical first step in understanding further the effects of OA in areas such as weight loss, alcohol tolerance, and hypertension.

Kathleen Chiddenton graduated from Cole Harbour District High School in Dartmouth, Nova Scotia in 2006. She is currently completing her honours thesis in her fourth year of biology at Acadia University. While at Acadia Kathleen has received the Acadia Excellence Scholarship, the Harry T. Walker Memorial Scholarship, Academic Honours Award, and NSERC funding for her research. She is currently a teaching assistant for introductory biology and has previously done so in chemistry. Kathleen is now employed as a lab technician in the biology research lab. She has spent some volunteer time working with the SMILE program which works on building personal and life skills for children with mental or physical disabilities. After graduating, Kathleen plans on going to Dalhousie University to get her Masters degree in Speech Language Pathology. She hopes to one day work in a children’s hospital, such as the IWK, helping to rehabilitate children’s speech after devastating brain trauma.