The Behavioral and Physiological Effects of Nicotine on Crayfish

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In many areas of the world where smoking is permitted, cigarette butts are often not properly disposed of. They get tossed onto the ground, where they eventually get washed away by precipitation and enter streams and rivers. Organisms often inhabit these streams and suffer from the nicotine still present in the butts. Nicotine is a known to alter important neurological functions in many animals. Many stream and lake borne animals are dependent on proper neurological function for escape responses. Since crayfish are readily accessible and relatively easy to work with for physiological and behavioral experiments I chose to work with them for my studies. Crayfish are also known as sentinels of water quality in streams, as many studies have been designed around them. My project tested the effects of nicotine on the behavior and physiology of crayfish during an escape response. In addition, I examined the effects of nicotine directly on the central nervous system (CNS) of the crayfish. Finally, I tested the effects of nicotine on the habituation of the crayfish response to a tail touch. The results indicate that nicotine caused the crayfish to lose the ability to respond to their environment, as predicted. However, instead of correlating with lack of a physiological response as predicted, nicotine correlated with a decrease in physiological function in response to stimuli, further impairing the animal. The CNS tests showed a reduced sensory-CNS-motor drive under the effects of nicotine. And finally, the habituation tests are still underway and are thus inconclusive.

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