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**Corticostriatal Pathway Inactivation and Connections to
Associative Learning with Nicotine Stimulus
In Rats**

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Spring 2021

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Abstract

The main concern of this study is looking into the neural mechanisms of associative learning with a nicotine stimulus. The goal of this study was to find out if inactivating the corticostriatal pathway through DREADDs (Designer Receptors Exclusively Activated by Designer Drugs) inhibited goal tracking behavior in rats. In this experiment, rats underwent two surgeries. One was to inject DREADDs into the infralimbic cortex and the other in the dorsomedial caudate putamen (dmCPu). Rats initially trained on levers through water deprivation. Once they reached criterion, they moved onto the self-administration phase. After the rats trained in self-administration sessions with sucrose dipper-entries and nicotine infusions, they received injections of clozapine-N-oxide (CNO) to activate DREADDs. Activating the DREADDs then inactivated the corticostriatal pathway. We performed histological assessments to determine the location of DREADDs and track marks of infusions to confirm coordinates in the brain sections. Anticipated results stem from our hypothesis in which we suggest goal-tracking behaviors in rats will halt after injections of CNO following a nicotine infusion. Further research needs to be conducted to show the potential of using non-invasive DREADDs technology to investigate the neural mechanisms of addiction.