In the face of the rising heroin and prescription opioid epidemic, novel treatments are being investigated for individuals who are resistant to traditional therapies such as cognitive behavioral therapy and pharmacological treatment. Interest in using deep brain stimulation (DBS) to manage and treat drug addiction is increasing due to success seen in Parkinson’s disease patients with unrelated compulsive disorders. It has previously been shown that both lesions of the subthalamic nucleus (STN) and stimulation of the STN decrease cocaine responding in a progressive ratio (PR) session, as well as the time spent in a cocaine-paired chamber in a conditioned place preference test. Evidence that STN stimulation also exerts GABAergic and glutamatergic outputs from the STN supports the idea that the effects of STN stimulation on cocaine intake may be extended to other drugs of abuse. Indeed, inactivation of the STN through high frequency stimulation decreases compulsive-like self-administration of heroin.

Our objective was to investigate the consequences of STN high frequency stimulation on the neuronal network associated with the STN and addiction-related brain regions.

**INTRODUCTION**

**REFERENCES**

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**CONCLUSIONS**

1) As predicted, STN high frequency stimulation decreases cFos expression in the direct output regions of the substantia nigra pars reticulata, and the globus pallidus.

2) Neuronal activity was decreased in the shell of the nucleus accumbens, suggesting that inactivation of the STN has the ability to alter the perception of reward and positive reinforcement.

3) This study provides anatomical support to behavioral data suggesting that deep brain stimulation has potential to treat heroin addiction in medication-resistant patients.