

Stimulating the brain blunts cigarette craving

16 April 2013

Cigarette smoking is the leading cause of preventable deaths globally. Unfortunately smoking cessation is difficult, with more than 90% of attempts to quit resulting in relapse.

There are a growing number of available methods that can be tried in the effort to reduce smoking, including medications, behavioral therapies, hypnosis, and even acupuncture. All attempt to alter brain function or behavior in some way.

A new study published in *Biological Psychiatry* now reports that a single 15-minute session of high frequency [transcranial magnetic stimulation](#) (TMS) over the prefrontal cortex temporarily reduced cue-induced smoking craving in nicotine-dependent individuals.

Nicotine activates the dopamine system and reward-related regions in the brain. [Nicotine withdrawal](#) naturally results in decreased activity of these regions, which has been closely associated with craving, relapse, and continued nicotine consumption.

One of the critical reward-related regions is the dorsolateral prefrontal cortex, which can be targeted using a [brain stimulation](#) technology called transcranial magnetic stimulation. Transcranial magnetic stimulation is a non-invasive procedure that uses magnetic fields to stimulate [nerve cells](#). It does not require sedation or anesthesia and so patients remain awake, reclined in a chair, while treatment is administered through coils placed near the forehead.

Dr. Xingbao Li and colleagues at Medical University of South Carolina examined cravings triggered by smoking cues in 16 nicotine-dependent volunteers who received one session each of high frequency or sham [repetitive transcranial magnetic stimulation](#) applied over the [dorsolateral prefrontal cortex](#). This design allowed the researchers to ferret out the effects of the real

versus the sham stimulation, similar to how placebo pills are used in evaluating the effectiveness and safety of new medications.

They found that craving induced by smoking cues was reduced after participants received real stimulation. They also report that the reduction in cue-induced craving was positively correlated with level of nicotine dependence; in other words, the TMS-induced craving reductions were greater in those with higher levels of nicotine use.

Dr. John Krystal, Editor of [Biological Psychiatry](#), commented, "One of the elegant aspects of this study is that it suggests that specific manipulations of particular brain circuits may help to protect smokers and possibly people with other addictions from relapsing."

"While this was only a temporary effect, it raises the possibility that repeated TMS sessions might ultimately be used to help smokers quit smoking. TMS as used in this study is safe and is already FDA approved for treating depression. This finding opens the way for further exploration of the use of brain stimulation techniques in smoking cessation treatment," said Li.

More information: The article is "Repetitive Transcranial Magnetic Stimulation of the Dorsolateral Prefrontal Cortex Reduces Nicotine Cue Craving" by Xingbao Li, Karen J. Hartwell, Max Owens, Todd LeMatty, Jeffrey J. Borckardt, Colleen A. Hanlon, Kathleen T. Brady, and Mark S. George ([doi: 10.1016/j.biopsych.2013.01.003](#)). The article appears in *Biological Psychiatry*, Volume 73, Issue 8 (April 15, 2013)

Provided by Elsevier

APA citation: Stimulating the brain blunts cigarette craving (2013, April 16) retrieved 5 May 2021 from <https://medicalxpress.com/news/2013-04-brain-blunts-cigarette-craving.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.