

Study with 'never-smokers' sheds light on the earliest stages of nicotine dependence

September 9 2015



Credit: Vera Kratochvil/public domain

In a study with 18 adults who had never smoked, scientists at Johns Hopkins report they have demonstrated one of the earliest steps—nicotine "reinforcement"—in the process of addiction, and shown that some people are far more vulnerable to nicotine addiction than others.

In a summary of the research, published online Sept. 8 in the journal *Psychopharmacology*, the investigators say they have, for the first time, characterized the body's reaction to the first, tiniest "hits" of nicotine. The results, they say, should lay groundwork for future revelations about genetic or other biological factors that make people vulnerable to [nicotine addiction](#).

"From an addiction point of view, nicotine is a very unusual drug," says addiction researcher Roland R. Griffiths, Ph.D., professor of psychiatry and behavioral sciences at the Johns Hopkins University School of Medicine. "When you give people nicotine for the first time, most people don't like it. It's different from many other addictive drugs, for which most people say they enjoy the first experience and would try it again."

"Our results suggest there are definitely some people who are nicotine avoiders and others who are nicotine choosers," he says, "and there are probably genetic or metabolic vulnerabilities that make people fall into one group or the other."

Scientists, Griffiths notes, have struggled for decades to understand why, in the face of initial dislike, so many become addicted to cigarettes. Previous research, for example, has shown that a majority of never-smokers given a cigarette or dose of nicotine not only report disliking the effects, but later, when offered a nicotine -containing [pill](#), gum or candy, or a placebo—a classic test of the "reinforcement" abilities of an addictive drug—they chose the placebo.

Similarly, even in laboratory mice and rats, nicotine usually fails the reinforcement test, with animals choosing a placebo over nicotine.

In a novel effort to get at the root of the puzzle, Griffiths and his team set out to explore the conditions under which nicotine's reinforcement

properties first take hold in never-smokers.

Rather than use a dose of nicotine similar to that in a cigarette or in a [nicotine patch](#) or gum—doses that can overwhelm first-time users—his team turned to doses around 10 times lower, barely above what is needed for someone to notice nicotine's effects, such as relaxation, jitters, better focus, energy or changes in mood.

Then the researchers designed a double-blind study in which volunteers wouldn't know whether they were getting nicotine or a placebo.

"We attempted to develop conditions in which people could learn to become familiar with the subtle mood-altering effects of very low doses of nicotine, with the goal of uncovering the reinforcing effects of nicotine," he says.

For the study, Griffiths and his team recruited 18 healthy men and women who had never smoked—or only ever smoked a handful of cigarettes—and gave each of them two identical-looking pills labeled A and B each day for several weeks. The volunteers were told the pills might contain any of a number of substances, ranging from caffeine or sugar, to ginseng, chamomile, theobromine, kava or nicotine.

In fact, each day, each volunteer was given one very-low-dose nicotine pill, starting at 1.5 milligrams of nicotine per 70 kilograms of body weight, and one placebo, with at least two hours between the pills. The order of the pills was mixed across days. Volunteers were asked to report their symptoms—relaxation, changes in energy levels, concentration, light-headedness, drowsiness and jitters—after each pill. Then, on at least 10 successive days, they were given the same pills again, this time unlabeled, and asked to identify which pill was A and which was B. If the volunteer was unable to reliably distinguish between mystery pill A and mystery pill B, the dose of nicotine was increased slightly. Once

each volunteer could reliably distinguish between pill A and B, they were given a choice of taking either pill and asked to explain their decision. Some people thought the placebo contained a drug—one that made them drowsy, for instance—so they weren't necessarily choosing one they thought didn't cause symptoms.

Nine of the 18 participants reliably chose the nicotine pill, citing improved concentration, alertness, stimulation, energy and better mood. The other half, however, chose the [placebo](#), often explaining that the nicotine pill—although they didn't know it contained nicotine—made them feel light-headed, dizzy or sick.

Griffiths believes this is the first study to conclusively show that nicotine can pass the reinforcement test in never-users, and he expects it will inform future studies of "avoiders" and "choosers." Ultimately, he says, "I hope our findings will point the way toward future interventions that prevent or treat nicotine addiction, a topic of increasing importance in light of the expanding marketing of electronic nicotine delivery devices—e-cigarettes—to youthful [nicotine](#) nonusers."

More information: Nicotine reinforcement in never-smokers, link.springer.com/article/10.1007/s00213-015-4053-4

Provided by Johns Hopkins University School of Medicine

Citation: Study with 'never-smokers' sheds light on the earliest stages of nicotine dependence (2015, September 9) retrieved 27 April 2024 from <https://medicalxpress.com/news/2015-09-never-smokers-earliest-stages-nicotine.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.