

Study identifies mechanism by which nicotine withdrawal increases junk food consumption

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New data collected by University of Minnesota Medical School researchers demonstrate a clear connection between nicotine withdrawal

and poor eating habits. Their findings point to the opioid system, the brain functions responsible for addiction and appetite regulation, as a possible cause for smoker preference of energy-dense, high-calorie food during nicotine withdrawal. This can lead to weight gain, for those who quit smoking, which, in turn, may increase the risk of relapse.

Mustafa al'Absi, Ph.D., a licensed psychologist and professor in the Department of Family Medicine and Biobehavioral Health at the U of M Medical School, Duluth Campus, is the principal investigator and the senior author of the study recently published in the Journal *Drug and Alcohol Dependence*.

"We looked at whether or not acute nicotine withdrawal increases the intake of junk food—high in salt, fat and sugar—and how the stress-relieving receptors of the opioid system are involved," al'Absi said. "Mitigating these challenges during the treatment process will help patients quit smoking while understanding their eating habits and encourage healthier decisions."

The team studied a group of smoking and non-smoking participants between the ages of 18 and 75 during two laboratory sessions. All were randomly assigned to do a 24-hour withdrawal from nicotine products and administered either a placebo or 50 mg of naltrexone. At the end of each session, participants were given a tray of snack items that differed in high to low energy density and dimensions of salty, sweet and fat. The study found that:

- **Smokers undergoing nicotine withdrawal consumed more calories than non-smokers.** Participants were also less likely to select high-fat food after the naltrexone was administered than placebo. "The study's findings may be related to the use of food, especially those high in calories, to cope with the negative affect and distress that characterizes the feelings people experience

during smoking withdrawal," al'Absi said. "Results from preclinical and clinical research support this and demonstrate that stress increases proclivity for high-fat and high-sugar foods."

- **Naltrexone normalized calorie intake to levels seen in non-smokers, suggesting that the opioid system may be a mechanism of withdrawal-induced intake of calories.** "This is rather a novel finding in the context of nicotine addiction and has lots of implications for the development of future treatment," al'Absi said. The choice and consumption of [food](#) items were impacted by the participants' smoking backgrounds.

al'Absi and his team are now focusing on the impact of appetite changes on weight gain post-cessation and the extent to which these changes hinder smoking cessation and increase the risk of relapse. Future work will be critical to identifying the mechanisms of these changes and could be targeted for therapeutic interventions.

"These findings extend earlier studies that indicate the impact of tobacco use on appetite and help identify the influence of an important biological link, the brain opioid system, on craving during [nicotine withdrawal](#)," al'Absi said. "The fear of weight gain is a major concern among smokers who think about quitting. The key to removing these barriers is to better understand the factors that increase the urge for high-caloric foods."

More information: Justin J Anker et al, Tobacco withdrawal increases junk food intake: The role of the endogenous opioid system, *Drug and Alcohol Dependence* (2021). [DOI: 10.1016/j.drugalcdep.2021.108819](https://doi.org/10.1016/j.drugalcdep.2021.108819)

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