

Sugar in the diet may increase risks of opioid addiction

October 16 2017, by Francesco Leri



Credit: AI-generated image ([disclaimer](#))

Could a diet high in refined sugars make children and adults more susceptible to opioid addiction and overdose? New research, from our laboratory of behavioral neuroscience at the University of Guelph, suggests it could.

Approximately [20,000 people died of fentanyl-related overdoses](#) in the United States last year and in Canada there were [at least 2,816 opioid-related deaths](#). During 2017 so far, [over 1,000 people have died](#) of illicit drug overdoses in British Columbia. [High schools are stocking up on the overdose-reversing drug naloxone](#) and [universities are training staff to administer the drug](#).

Nobody is talking about sugar.

And yet there is substantial experimental evidence that [refined sugar can promote addictive behaviours](#) by activating the brain's rewards centres in much the same way as addictive drugs. [Opioid abuse is also associated with poor dietary habits](#), including preferences for sugar-rich foods, as well as malnutrition. These connections have led to questions of whether excessive consumption of refined sugar may affect vulnerability to [opioid](#) addiction.

To explore the possible role of a sugar-rich diet in opioid addiction, we investigated whether unlimited access to high fructose corn syrup (HFCS) altered rats' neural and [behavioural responses](#) to the semi-synthetic opioid, [oxycodone](#).

Our findings suggest that a diet high in corn syrup may dampen the reward associated with oxycodone and may therefore encourage consumption of higher quantities of the drug.

Opioids, high fructose corn syrup and addiction

High fructose corn syrup is a refined sugar that typically includes more fructose than glucose. It is a commonly used food additive in North America, produced by chemically processing corn. Although it is employed in many processed foods, its use in soft drinks appears to have the biggest impact on health. In fact, there is a significant relationship

between [increased consumption of sugar-sweetened beverages and weight gain, metabolic syndrome and hypertension.](#)



Public health officials recommend school administrators buy a naloxone anti-overdose kit, like the one shown in this 2017 file photo, if they are aware of drug use on or near to school grounds. Credit: THE CANADIAN PRESS/Jonathan Hayward

Recently, our laboratory has been exploring the [impact of HFCS on behaviours and brain markers of addiction](#) in laboratory rats. In one study conducted by my PhD student Meenu Minhas, animals had unrestricted around-the-clock access to bottles containing a water solution sweetened by HFCS. After about a month of voluntary drinking,

the bottles were removed and, after a few sugar-free days, animals' behavioural and neural responses to oxycodone were assessed.

Similar to other opioids, oxycodone induces pharmacological effects that include analgesia, euphoria and feelings of relaxation. Some common street names include: "hillbilly heroin," "perc," and "OC." Oxycodone is the active ingredient in a number of formulations which include intravenous injections, immediate release solutions/capsules (Percocet, Percodan, OXY IR, OXY FAST), and extended release preparations (OxyContin).

Oxycodone is also highly addictive and has impacted the lives of numerous North Americans. There are estimates that its consumption [increased by almost 500 per cent from 1999 to 2011](#). The U.S. [National Survey on Drug Use and Health](#) revealed that approximately 27.9 million people aged 12 or older used oxycodone products. Moreover, 4.3 million people aged 12 or older reported misusing oxycodone-containing products in the past year.

Dampening drug's reward may increase use

At the neural level, HFCS exposure decreased oxycodone-induced release of dopamine, which is a desire-promoting neurotransmitter active in the brain's reward circuits.

Furthermore, at low doses, sedative drugs like opioids and alcohol normally interfere with inhibition and stimulate a variety of "psychomotor" behaviors —such as sociability, extroversion, talkativeness, sensation seeking and interest in novelty. Our study in rats found that exposure to the high fructose corn syrup reduced this psychomotor stimulation induced by oxycodone.

Our experiments show that chronic exposure to high fructose corn syrup

had an impact on both the neural and behavioural responses to oxycodone, resulting in changes likely to affect drug-taking and drug-seeking behaviour. They suggest that a high sugar diet may dampen the reward associated with a given dose of oxycodone. And that this may cause people to consume more of the drug.

These results suggest that nutrition, and high fructose corn syrup intake in particular, can influence responses to opioids—a finding that may be relevant both to clinical uses of opioids and to treatment of addiction.

We can win the war on opioid addiction only if we tackle the problem from multiple angles. Our findings, and those of other laboratories, strongly suggest that prevention of unhealthy diets may not only help reduce the obesity epidemic, but also reduce environmental factors that may predispose to opioid addiction.

This article was originally published on [The Conversation](#). Read the [original article](#).

Provided by The Conversation

Citation: Sugar in the diet may increase risks of opioid addiction (2017, October 16) retrieved 23 April 2024 from <https://medicalxpress.com/news/2017-10-sugar-diet-opioid-addiction.html>

<p>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.</p>
--