

Primary Navigation

- [News Home](#)
- [U.S.](#)
- [Business](#)
- [World](#)
- [Entertainment](#)
- [Sports](#)
- [Tech](#)
- [Politics](#)
- [Science](#)
- [Health](#)
- [Most Popular](#)
- [Index](#)

Secondary Navigation

- [Weight Loss](#)
- [Sexual Health](#)
- [Medications/Drugs](#)
- [Parenting/Kids](#)
- [Seniors/Aging](#)
- [Diseases/Conditions](#)

Search:

[Advanced](#)



Nicotine affects brain like heroin: study

Mon Jun 20, 11:21 AM ET

NEW YORK (Reuters Health) - New research hints at why it's so hard to quit smoking. In a mouse study, Pennsylvania researchers found that nicotine affects the brain through the same mechanism as heroin and other opiate drugs.

What's more, when nicotine-addicted mice were placed in the same cage where they had received

nicotine before, the same signals in the brain were set off as when mice were actually given nicotine -- showing that certain cues reinforce the addiction.

But a drug that reverses the effects of narcotic drugs blocked both the effect of nicotine in the brain and the similar effect set off when mice were in the cage they associated with nicotine.

Anyone who has tried to quit smoking knows that nicotine is extremely addictive, and that certain situations trigger the desire to smoke.

Part of nicotine's hold on smokers is believed to be due to its effect on brain levels of dopamine, which is associated with feelings of well-being. But there is evidence from several studies that nicotine also causes a rise in levels of opioids -- naturally occurring chemicals that are similar to opiate drugs.

Now, Dr. Julie A. Blendy and colleagues at the University of Pennsylvania in Philadelphia indeed found that nicotine affects the brain pathway activated by heroin and other opiate drugs, at least in mice.

In the experiments, mice that were given nicotine showed a rise in levels of a protein called CREB. This protein is thought to be involved in the brain's response to many drugs of abuse.

But levels of this protein rose not only when mice were given nicotine but also when they were in placed in a location where they had previously received nicotine, Blendy and her colleagues report in the journal *Neuron*.

These effects were absent in mice that lacked opioid receptors, which respond to the body's natural painkillers as well as to drugs such as heroin and morphine.

A single dose of the drug naloxone, which reverses the effect of heroin and other similar drugs, blocked both responses -- to nicotine and to being in a place associated with nicotine.

The results raise the possibility of using opioid-blocking drugs to treat nicotine addiction.

In past studies, opioid-blocking drugs have not been effective at helping people quit smoking. But Blendy and her colleagues note that these studies were carried out in hospitals or in labs, not in places where people normally light up. It might make more sense, according to the researchers, to study the effects of these drugs when taken just before people are placed in situations when they may be tempted to smoke.

SOURCE: *Neuron*, June 16, 2005.

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[Advanced](#)

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- [News Home](#)
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- [Business](#)
- [World](#)
- [Entertainment](#)
- [Sports](#)
- [Tech](#)
- [Politics](#)
- [Science](#)
- [Health](#)
- [Most Popular](#)
- [Odd News](#)
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