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**Woman who has never felt pain experiences it for the first time**

A woman born incapable of feeling pain has been hurt for the first time – thanks to a drug normally prescribed for opioid overdoses. She was burned with a laser, and quite liked the experience.

The breakthrough may lead to powerful new ways to treat painful conditions such as arthritis.

Only a handful people around the world are born unable to feel pain. These individuals can often suffer a range of injuries when they are young. Babies with the condition tend to chew their fingers, toes and lips until they bleed, and toddlers can suffer an increased range of knocks, tumbles and encounters with sharp or hot objects.

The disorder is caused by a rare genetic mutation that results in a lack of ion channels that transport sodium across sensory nerves. Without these channels, known as Nav1.7 channels, nerve cells are unable to communicate pain. Researchers quickly sought to make compounds that blocked Nav1.7 channels, thinking they might be able to block pain in people without the disorder.

“It looked like a fantastic drug target,” says [John Wood at University College London](https://www.ucl.ac.uk/wibr/research/molecular-nociception-group/john-wood). “Pharma companies went bananas and made lots of drugs.” But while a few compounds [saw some success](http://www.convergencepharma.com/userfiles/file/140923_LSR_FINAL.pdf), none brought about the total pain loss seen in people who lack the channel naturally.

## No pain, no reaction

To find out why, Wood and his colleagues studied mice that had been genetically modified to lack Nav1.7. These animals don’t feel pain, either – they show no reaction when their tails are exposed to extreme hot or cold temperatures, for example.

A closer analysis of the rodents’ nerves showed that mice lacking Nav1.7 had a huge increase in the expression of genes responsible for opioid peptides, the body’s natural painkiller. The mice seem to be making more of these pain-relieving peptides, which might explain why people lacking the channel don’t feel pain, either.

If that were the case, figured Wood, a drug that blocks the action of opioid peptides may reverse the disorder. Sure enough, when the team gave mice naloxone – a drug that blocks opioid receptors and used to treat overdoses of morphine and heroin – the animals were able to feel pain again.

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What’s more, the team saw the same effect in people. When a 39-year-old woman who had never felt pain in her life was given naloxone, she was able to feel pain from a hot laser for the first time ever. “I think she quite enjoyed the experiment,” says Wood. The woman, who wishes to stay anonymous, says she hopes that the drug could be used to treat any children she might have with the same condition.

Wood isn’t sure whether this will be an option, since long-term use of naloxone could have side effects. The opposite approach, however, may be used to treat pain, he says. When his team gave mice Nav1.7 channel blockers together with opioid drugs, they managed to stop them feeling any pain.

The mice in this experiment felt as little pain as mice who lacked the Nav1.7 channel naturally, says Wood. He has taken out [a patent](https://patentscope.wipo.int/search/en/detail.jsf?docId=WO2015036734) on the use of the two drugs for pain relief.

Kenji Okuse at Imperial College London thinks the findings may change the way doctors think about treating pain conditions, but need further examination. “Opioids and Nav1.7 blockers could provide much stronger analgesics, but they will not necessarily be better for patients,” he says. “If we take the combination therapy route, people would have to take opioids throughout the lifetime, which is not a welcome thing.”

*[Nature Communications](http://www.nature.com/ncomms/2015/151204/ncomms9967/full/ncomms9967.html)*[, DOI: 10.1038/ncomms9967](http://www.nature.com/ncomms/2015/151204/ncomms9967/full/ncomms9967.html)