How a woman who never felt pain helped researchers find a potential way to develop better painkillers

[http://www.gravatar.com/avatar/8aee44f0e0a3d691e9438b1e20845362?s=34&d=mm](http://news.nationalpost.com/author/npwapo)

[**Sarah Kaplan, Washington Post**](http://news.nationalpost.com/author/npwapo) | December 7, 2015 9:31 AM ET  
[More from Washington Post](http://news.nationalpost.com/author/npwapo)

The woman was 39 years old and had never felt pain.

She is one of a handful of people with congenital insensitivity to pain (CIP), an extremely rare genetic disorder that prevents messages of physical suffering – a sting, a bite, a bruise, a burn – from reaching the brain.

For many, the condition is less a superpower than a curse. Pain, after all, serves a purpose. It’s the body’s way of preventing us from doing things that harm it, like barreling into furniture or touching a hot stove. Babies with the condition will chew their fingers and toes until they bleed. Adults are more likely to die prematurely.

So when neurobiologist John Wood helped the 39-year-old woman (who is unnamed in his report) experience pain for the first time – with a laser beam and a dose of the opioid antagonist naloxone – it seemed like a gift.

“I think she quite enjoyed the experiment,” Wood, a professor at University College London, told the New Scientist.

Wood’s finding, published Friday in the journal Nature Communications, is a breakthrough not just for people who can’t feel pain, but for those who feel far too much of it. Working backwards from experiments with the 39-year-old and on mice that had been genetically modified to exhibit the CIP mutation, he and his UCL colleagues found what he calls the long-sought “secret ingredient” in painlessness.

By combining compounds called opioid peptides with drugs that block communication channels between the body and the brain, Wood was able to replicate in ordinary mice the painlessness that those with CIP feel intrinsically.

Individuals with CIP have a mutation in the gene responsible for producing what’s known as Nav1.7 channels, which transmit signals from pain-sensing nerves. Those channels have long been viewed by researchers and drug companies as the secret to finding an ultimate antidote to pain. If scientists could find a way to block Nav1.7 channels, they believed they’d be able to stop pain messages in their tracks.

But surprisingly, it didn’t work out that way.

“Many potent selective antagonists for Nav1.7 are weak analgesics,” Wood and his colleagues write in their study.

In other words, blocking Nav1.7 alone wasn’t enough to prevent pain. Something else must be going on.

To figure out what, Wood looked at the nerves of mice that had been genetically modified to exhibit CIP. He noticed that the genes responsible for producing opioid peptides, the body’s natural painkillers (in case it wasn’t clear from their name, these compounds have much the same effect as opiates), were a lot more prominent in these animals. If mice that lacked the Nav1.7 were also producing compounds that act like oxycodone and morphine, that could explain their total insensitivity to injury.

To test the theory, he gave the mice naloxone, the drug used to treat overdoses of oxycodone and morphine. And it worked – the previously inherently anesthetized mice were able to feel pain again. The same was true when Wood tested naloxone on the 39-year-old woman, who volunteered to participate in the experiment.

It was the combination of opioid peptides and Nav.1.7 blocking that produced painlessness in CIP patients, Wood concluded, not just one alone. He and his colleagues have filed a patent for combining low dose opioids with Nav1.7 blockers, he said in a UCL press release.

He writes in his study that the therapy could provide relief to the millions of people who suffer from debilitating chronic pain.

Speaking to the New Scientist, Imperial College London professor Kenji Okuse said that the findings may deepen doctors’ understanding of pain, but opioids and Nav1.7 blockers will not be a silver bullet.

“Opioids and Nav1.7 blockers could provide much stronger analgesics, but they will not necessarily be better for patients,” he said. “If we take the combination therapy route, people would have to take opioids throughout the lifetime, which is not a welcome thing.”