

Study suggests failed osteoarthritis drug could help treat opioid addiction

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Credit: Susan Buck Ms/Public Domain

A new study from Indiana University suggests that a drug proven safe for use in people may prevent opioid tolerance and physical dependence when used in combination with opioid-based pain medications.

Researchers in the Linda and Jack Gill Center for Biomolecular Science at IU Bloomington have discovered that a compound previously tested to treat osteoarthritis [pain](#) appears to block neuropathic pain and decrease signs of opioid dependence. The work is reported in the journal *Molecular Pharmacology*.

Human trials of the drug to treat osteoarthritis pain conducted by Indianapolis-based drug manufacturer Eli Lilly and Co. found that the drug lacked efficacy. However, the drug's use in treating other kinds of pain and lessening [opioid dependence](#) had not been tested before.

"The potential to quickly begin using this compound in combination with opioid-based medication to treat pain and reduce addiction makes this discovery very significant," said lead investigator Andrea G. Hohmann, a Linda and Jack Gill Chair of Neuroscience and professor in the IU Bloomington College of Arts and Sciences' Department of Psychological and Brain Sciences. "We already know this drug is safe for use in people, so moving into human trials will not require as many regulatory hurdles."

The need for non-addictive alternatives to opioid-based pain medication is urgent due to the rapid rise in overdose deaths over the past decade. According to the Centers for Disease Control and Prevention, over 64,000 Americans died from drug overdoses in 2016, including from illicit drugs and prescription opioids. To tackle this issue, IU last year launched the Responding to the Addictions Crisis Grand Challenge initiative to invest \$50 million to prevent and reduce addictions in Indiana.

To test the potential of the experimental drug to treat pain and reduce addiction symptoms, IU scientists administered the compound and the opioid [morphine](#) to male mice with [neuropathic pain](#). While morphine initially reduced the pain, mice quickly developed tolerance to morphine's effectiveness, similar to people who require higher doses of opioid over time to achieve relief.

However, when a low dose of the experimental drug was combined with morphine, the mice no longer became tolerant to morphine, and that lack of tolerance remained even after the experimental drug was discontinued. The researchers also found the experimental drug could produce sustained pain relief on its own at higher doses.

In another experiment, mice were given either morphine alone or morphine in combination with the experimental drug, and then treated with naloxone, which blocks the effect of opioids and

induces opioid withdrawal symptoms. Remarkably, Hohmann said, the experimental drug also decreased the severity of these symptoms.

Together, these results suggest the [experimental drug](#) could be used in combination with opioids to prevent tolerance, allowing satisfactory pain treatment with fewer side effects, or as a means to wean opioid-tolerant individuals off these drugs.

The researchers chose to explore the failed osteoarthritis [drug](#) because they had found that the compound acted in a unique way upon a target in the body known to play a role in pain relief.

More information: Xiaoyan Lin et al, Slowly Signaling G Protein–Biased CB2Cannabinoid Receptor Agonist LY2828360 Suppresses Neuropathic Pain with Sustained Efficacy and Attenuates Morphine Tolerance and Dependence, *Molecular Pharmacology* (2017). [DOI: 10.1124/mol.117.109355](#)

Provided by Indiana University

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