

## Using morphine after abdominal surgery may prolong pain, researchers find

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Using morphine to fight the pain associated with abdominal surgery may paradoxically prolong a patient's suffering, doubling or even tripling the amount of time it takes to recover from the surgical pain, according to researchers at the University of Colorado Boulder.

The research team from CU-Boulder's Department of Psychology and Neuroscience—led by Peter Grace, a postdoctoral research fellow, together with Erika Galer, a professional research assistant—was able to identify the mechanism that caused the prolonged pain. The scientists found that both the morphine and the surgery itself excited [glial cells](#) in the nervous system, causing them to send out additional pain signals to the surrounding nerves.

The research findings, which involved a study using rats, are being presented today at the annual meeting of the Society for Neuroscience in San Diego.

"After [abdominal surgery](#)—even without using any drugs to treat the pain—the glial cells would be activated and they would contribute to the postoperative pain," Grace said. "What we're saying is, if you give them morphine, we also know that contributes to the pain. If you're putting both of those on top of each other, you're going to have a prolonged period of pain."

Past research at CU-Boulder and elsewhere has shown that, while morphine is an effective painkiller, it can also work against itself.

Morphine binds to a receptor on neurons to dull the pain, but scientists now know that morphine also binds to a receptor on glial cells in the brain called TLR4, causing them to become excited and intensify the pain.

In the new study, the researchers found that rats that were given morphine for two weeks prior to surgery to treat pre-existing pain—but that were not given morphine after the procedure—took six weeks to fully recover from postoperative pain compared with two weeks among rats that were not given the painkiller.

In a second experiment, rats that were treated with morphine for a week after the surgery took four weeks to recover from the postoperative pain compared with two weeks among the control group of rats.

"We're seeing the pain prolong for weeks after the discontinuation of morphine," Grace said.

The research team also tested the effects of the drug (+)-naloxone, which inhibits morphine from binding to the glial cells and exciting them. They found that the use of (+)-naloxone along with the morphine eliminated the extended [postoperative pain](#) effect.

The researchers are now studying in more detail how morphine excites glial cells and how (+)-naloxone works to block that process. A better understanding of that pathway in the brain may help researchers find a wider variety of drugs that could be administered along with [morphine](#) in the future to limit postoperative [pain](#).

Provided by University of Colorado at Boulder

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