

Immune Cells May Underlie Sex Differences in Chronic Pain

The results suggest possible new chronic pain treatments that don't rely on addictive opioid medications.

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At a Glance

- A study in mice points to certain immune cells as a key reason why chronic pain is more common in women than men.
- The results suggest possible new chronic pain treatments that don't rely on addictive opioid medications.

Nearly 1 in 4 American adults lives with chronic pain. The condition is more common in women than men, though the reasons why remain unclear. The immune system works somewhat differently in men and women. This has led some scientists to investigate the immune system's potential role in sex differences in pain recovery.

An NIH-funded team of researchers led by Dr. Geoffroy Laumet of Michigan State University used mouse models of pain to investigate how the immune system contributes to sex differences in the persistence of pain. The study was published on February 20, 2026, in [Science Immunology](#).

The researchers induced an inflammatory immune reaction in the paws of mice and found that males had shorter periods of pain sensitivity than females. Yet there were no sex differences in the amount of inflammation that occurred. A separate mouse model of pain due to traumatic injury showed similar sex differences in how quickly their periods of pain sensitivity waned.

In both mouse models, males had higher levels of an anti-inflammatory molecule called interleukin-10 (IL-10) in their skin than females. In the first mouse model, males had more IL-10-producing immune cells called monocytes in their affected paws than females. The more of those cells they had, the faster they recovered from pain.

Male and female mice with low monocyte levels experienced longer-lasting periods of pain. So did mice whose monocytes could not produce IL-10. A drug that boosted the number of IL-10-

producing monocytes hastened pain recovery. However, it was ineffective in mice with monocytes that weren't able to make IL-10.

IL-10's effects on pain depended on its ability to influence sensory neurons in the skin. Mice whose sensory nerve cells lacked the receptor for IL-10 had slower pain resolution.

A series of experiments in male and female mice showed that sex hormones were responsible for the sex differences in pain duration. Male sex hormones were associated with higher IL-10 levels and faster pain recovery.

The researchers also examined data about pain severity in men and women after traumatic injuries. Among 245 people, pain levels were similar in both sexes shortly after injury. But after 12 weeks, men were in significantly less pain than women. Men also had higher levels of IL-10 and more monocytes in their bloodstream after their injuries. Higher IL-10 and monocyte levels were both associated with less pain 12 weeks after an injury.

These results suggest that IL-10-producing monocytes play a key role in sex differences in pain recovery. They also suggest that manipulating IL-10 levels may help speed up recovery from pain and overcome these sex differences.

"This opens new avenues for non-opioid therapies aimed at preventing chronic pain before it's established," Laumet says.

This [research summary](#) was published by the National Institutes of Health on March 10, 2026.