

# The pain debates

**Did you know that men and women use different biological systems to manage pain? A major new study in the multidisciplinary journal *PNAS Nexus* has revealed striking differences in how men and women experience pain relief when they use self-regulation techniques like mindfulness meditation.**

## What did the researchers do?

The team studied nearly 100 volunteers, split evenly between men and women. Each participant was exposed to controlled heat pain (a safe but uncomfortable warmth) and asked to rate their pain. They were then taught a mindfulness meditation technique, designed to help reduce pain.

Here's where it gets interesting. Participants were given either a harmless saline drip or naloxone drug that blocks the brain's opioid receptors. Opioids are the body's natural painkillers (like endorphins). By blocking these, the researchers could see whether meditation-based pain relief depended on the body's opioid system.

## What did they find?

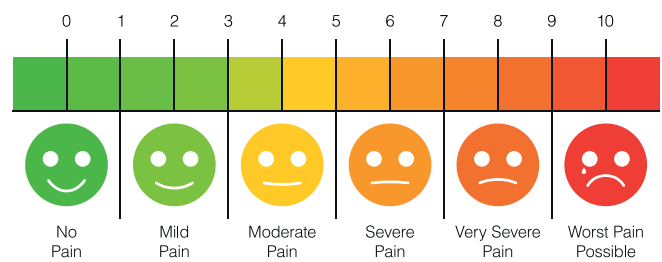
For men, meditation reduced pain but only when their opioid system was active. When naloxone blocked those receptors, the pain relief from meditation vanished. This suggests that men rely on their body's natural opioids for self-managed pain relief.

For women, meditation still reduced pain even when the opioid system was blocked. In other words, women appear to use a different, non-opioid system to manage pain through meditation.

## Why does this matter?

This is the first clear evidence that men and women use different biological pathways to control pain. It helps explain why women often experience chronic pain differently, and why opioid medications don't always work as well for them.

As co-author Fadel Zeidan put it: *"There are clear disparities in how pain is managed between men and women, but we haven't seen a clear biological difference in the use of their endogenous systems before now. This study provides the first clear evidence that sex-based differences*



*in pain processing are real and need to be taken more seriously when developing and prescribing treatment for pain."*

## What does this mean for pain management?

If you or someone you know deals with pain, these findings are a game-changer. They suggest that pain treatments may need to be tailored differently for men and women. Mindfulness and meditation can help both, but the way they work in the brain appears to differ.

The next steps are to identify exactly what non-opioid systems women use to manage pain, and to work out how we can harness this knowledge to develop better, more personalised pain relief for everyone.

## Conclusion

This study highlights a crucial and previously underappreciated difference in how men and women regulate pain. Understanding that men primarily rely on the body's opioid system for self-managed pain relief, while women engage alternative, non-opioid pathways, opens the door to more personalised and effective treatments. As research continues to unravel these mechanisms, healthcare providers will be better equipped to tailor pain management strategies according to sex, ultimately improving outcomes for everyone living with pain. Recognising and addressing these differences is a vital step towards more compassionate and precise care.

## Reference:

Dean JG, Reyes M, Oliva V, Khatib L, Riegner G, Gonzalez N, Posey G, Collie J, Birenbaum J, Chakravarthy K, Wells RE, Goodin B, Fillingim R, Zeidan F, Self-regulated analgesia in males but not females is mediated by endogenous opioids, *PNAS Nexus*, Volume 3, Issue 10, October 2024.