Men and women process pain signals differently

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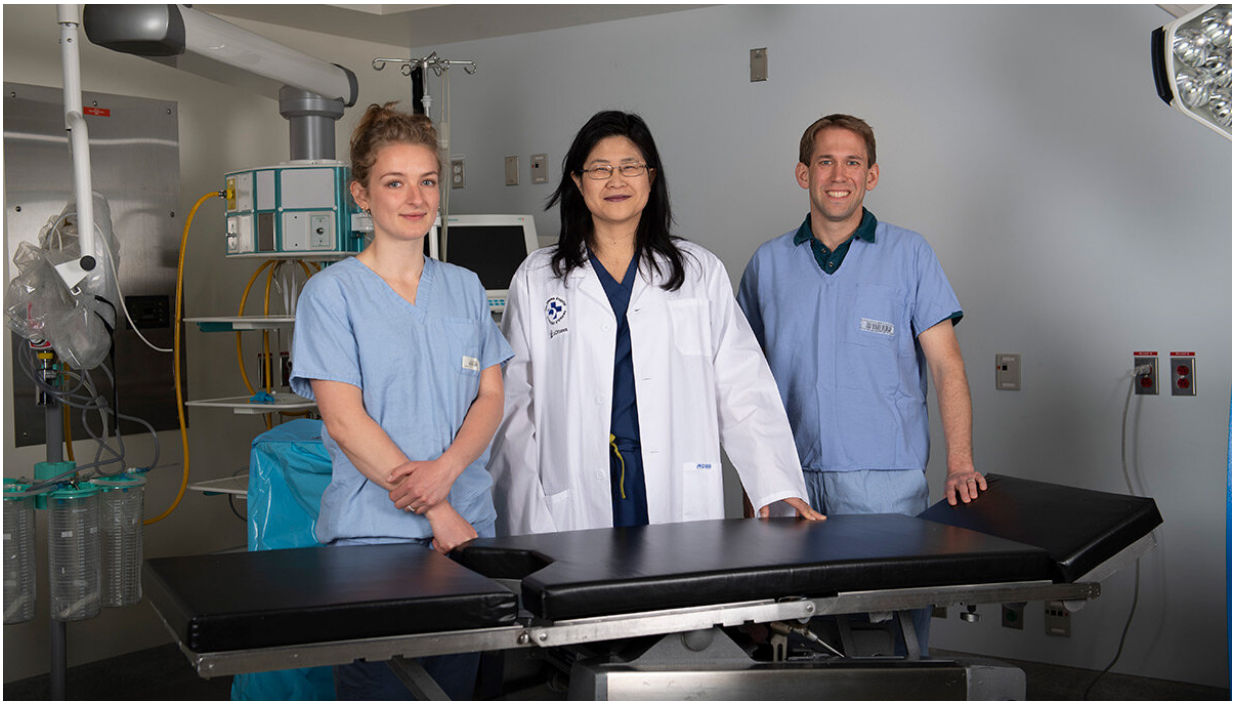

Drs. Annemarie Dedek, Eve Tsai and Mike Hildebrand (left to right) have shown for the first time that neurons in the spinal cord process pain signals differently in women compared to men. Credit: Justin Tang

A new study published in the journal *Brain* shows for the first time that neurons in the spinal cord process pain signals differently in women compared to men. The finding could lead to better and more personalized treatments for chronic pain, which are desperately needed,

especially in light of the opioid epidemic.

Although it has long been known that women and men experience pain differently, most pain research uses male rodents. The new study is unique because it used female and male spinal cord tissue from both rats and humans (generously donated by deceased individuals and their families).

By examining the spinal cord tissue in the laboratory, the researchers were able to show that a neuronal growth factor called BDNF plays a major role in amplifying spinal cord pain signaling in male humans and male rats, but not in female humans or female rats. When female rats had their ovaries removed, the difference disappeared, pointing to a hormonal connection.

"Developing new pain drugs requires a detailed understanding of how pain is processed at the biological level," said Dr. Annemarie Dedek, lead author of the study and now a MITACS- and Eli Lilly-funded industrial research fellow at Carleton University and The Ottawa Hospital. "This new discovery lays the foundation for the development of new treatments to help those suffering from chronic pain."

This is the first time a sex-related difference in pain signaling has been identified in human spinal cord tissue. Future studies are required to understand how this biological difference may contribute to differences in pain sensation between men and women.

More information: Sexual dimorphism in a neuronal mechanism of spinal hyperexcitability across rodent and human models of pathological pain, *Brain* (2021). DOI: 10.1093/brain/awab408

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