



## Cross-Sensitization: How Pelvic Pain Spreads

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Presented by Anna Malykhina, MSc, PhD – Professor and Director of Basic and Translational  
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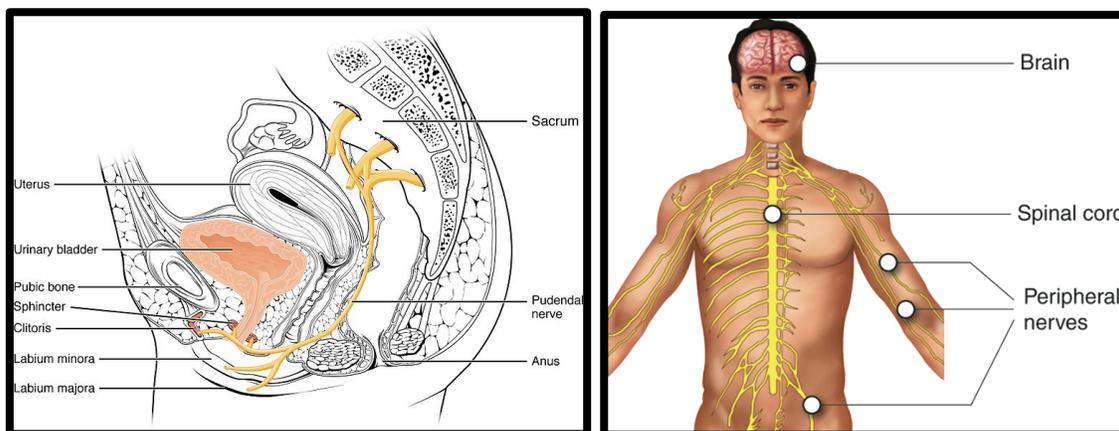
### Key Ideas

- The brain, spinal cord, and nerves help our pelvic organs “talk” to each other.
- This “talk” between the nerves of the pelvic organs means that a problem in one pelvic organ can lead to a problem in another. This is called “pelvic cross sensitization.”
- When a problem has been going on for a long time, it can make the pelvic organs, nerves, spinal cord, and brain more sensitive. This makes a “whisper” of pain sound like a “shout.”

### Inflammation in chronic pelvic pain

#### How does inflammation spread sensitivity across different pelvic organs?

- Inflammation happens when the body reacts to something harmful. For example, inflammation can occur with injury, infection, cancer, or allergies.
- Inflammation is seen in many chronic pelvic disorders. Some examples include endometriosis, interstitial cystitis/bladder pain syndrome, prostatitis, and inflammatory bowel disease.
- Inflammation stops after the disease is treated. Still, inflammation can cause long-term changes in the nerves. This is what happens in some types of chronic pain.



**Caption:** On the left is a side cross-section of the female pelvis. Highlighted in color are the urinary bladder (in peach) and the sacral nerves 2-4 with some branches becoming the pudendal nerve (in yellow), which is one of the nerves that “talk” to the bladder. Image credit: Wikimedia Commons. On the right is color picture of a man. On top of the man is a picture of the brain (in pink), spinal cord (in yellow), and peripheral nerves (in yellow). Image credit: Cenveo.

## Cross-sensitization

### What does pelvic organ cross-sensitization mean?

- The pelvic organs are supplied by nerves that control the functions of the organs such as bladder or bowel emptying or uterus contractions. Nerves leaving the organs travel to the spinal cord and the brain. The organs send signals or information through these nerves about fullness, pain, etc., to the brain.
- Different pelvic organs can talk to or send signals to the same nerve in the spinal cord and the brain.
- All of this “talk” between the pelvic organs, nerves, spinal cord, and brain can cause crossed wires. In other words, a problem such as pain sensation in one area can lead to a problem or pain in another. This is called “pelvic cross sensitization.”
- When a problem has been going on for a long time, it can make the pelvic organ, nerves, spinal cord, and brain more sensitive. What are small signals can grow much larger, like sending the signal over a loudspeaker or megaphone.

### How does “cross-sensitization” occur?

- An injury or disease leads to inflammation.
- Inflammation causes the nerve to become more sensitive (hypersensitive).
- The sensitive nerve now picks up information that are both painful and non-painful.
- The sensitive nerve carries this information to the spinal cord, then to the brain.
- The areas in the brain and spinal cord become hypersensitive.
- The brain and spinal cord, in turn, send hypersensitive signals back down to the pelvic organs. This is how a “whisper” of pain becomes a “shout.”
- If this process continues for weeks or months, the pelvic organs can become painful or stop working properly.

- In chronic pain, this process becomes a "vicious cycle." The pelvic organs make the nerve, spinal cord, and brain more sensitive. Then the brain, spinal cord, and nerves make the pelvic organs more sensitive to pain.

### **What are examples of organs are involved in “cross-sensitization”?**

- In animal studies, the following organs were shown to "cross-talk" to each other:
  - Uterus and urinary bladder
  - Colon and urinary bladder
  - Uterus and colon
  - Prostate and urinary bladder

### **Have questions?**

Schedule an appointment to talk to your local pelvic pain specialist!

Find a provider near you on the IPPS website: [pelvicpain.org](http://pelvicpain.org).

### **References**

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