**Neurons that respond to vibration discovered in the clitoris and penis**

**By**[**Alice Klein**](https://www.newscientist.com/author/alice-klein/) **30 June 2023**



**Microscope images of Krause corpuscles in the clitoris (left) and penis (right) of mice Lijun Qi, Harvard University**

Mysterious neurons in the clitoris and penis turn out to respond to vibration and light touch, and seem to be crucial for healthy sexual function and possibly pleasure. The finding solves a 160-year-old mystery and may explain why vibrators are sexually stimulating.

In 1860, Wilhelm Krause, a German anatomist, [identified clusters of nerve endings in the human clitoris and penis](https://www.medicusbooks.com/2-Medizin/Neuroscience/Neuroanatomie/Krause-Wilhelm-Die-Terminalen-Koerperchen-der-einfach-sensiblen-Nerven-Anatomisch-Physiologische-Monographie%3A%3A6769.html) that were named Krause corpuscles. Their function was unclear, however, and they were largely forgotten.

[Lijun Qi](https://www.gintylab.hms.harvard.edu/lab-members) and his colleagues at Harvard University came across Krause corpuscles while reviewing old literature and wondered whether they could use modern tools to uncover their function.

First, the researchers used staining techniques to examine Krause corpuscles in male and female mice, finding they were densely concentrated in the clitoris and more sparsely spread throughout the penis.

Next, they applied various stimuli to male and female mouse genitals. The neurons inside the Krause corpuscles were most responsive when the genitals were touched with a vibrating device or stroked with a paintbrush, as determined by measuring their electrical activity.

To explore the role of these neurons, Qi and his colleagues genetically engineered male mice so their Krause corpuscle neurons would be activated by illuminating them with blue light, rather than by physical touch.

When the researchers shone blue light on the penises of five of these males, the mice all developed erections. They didn’t repeat the experiment in female mice because their sexual responses are harder to visually observe.

However, they did genetically engineer female mice to lack Krause corpuscles and found they tended to be less receptive to males’ sexual advances and ended intercourse earlier than regular females. Similarly, males engineered without Krause corpuscles took longer to initiate sex, withdrew earlier and were less likely to ejaculate than typical males.

Together, these findings suggest that stimulation of Krause corpuscles is key for motivating sex and for allowing healthy sexual function, possibly by producing pleasurable sensations, says Qi.

The neurons in Krause corpuscles are probably stimulated during sex by microvibrations that transmit through the skin as partners’ genitals rub against each other, he says.

Krause corpuscles probably serve a similar role in people as they do in mice, since they are anatomically similar, says team member Michael Iskols, also at Harvard. In fact, vibrators that are commonly used for human sexual stimulation typically [produce the same vibration frequencies](https://doi.org/10.1080/14681994.2012.660141) as those that most strongly activated the nerves in mice – about 40 to 80 hertz, he says.

This may explain why [vibrators can sometimes help to treat sexual dysfunction](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7678782/), say the researchers. Vibrators have been used to [treat female sexual arousal disorder](https://journals.lww.com/fpmrs/Abstract/2017/07000/The_Effects_of_a_Genital_Vibratory_Stimulation.9.aspx), for example, and a vibrating device called Viberect is approved by the US Food and Drug Administration [for treating erectile dysfunction](https://www.accessdata.fda.gov/cdrh_docs/pdf14/K142304.pdf).

[Ingvars Birznieks](https://research.unsw.edu.au/people/associate-professor-ingvars-birznieks) at the University of New South Wales in Australia says that many other skin receptors throughout the body respond to vibration. “Sensing vibrations is the most important sensory input shaping tactile perception,” he says. “For example, to explore properties of materials or surfaces of objects, we always slide or rub fingertips over the surface to induce vibrations.”

The idea that this particular type of receptor might be specialised to sense vibrations regulating sexual function, however, is an intriguing finding that is worth exploring further, he says.