

The sixth sense -- your place in space

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In addition to the familiar five senses—touch, sight, smell, hearing, and taste—scientists know of a sixth sense called proprioception. It's the sense of where your body is in space that allows you to touch your nose even with your eyes closed. Proprioception (PRO-pree-oh-ception) also informs balance and how to put one foot in front of the other to walk without looking at your feet.

LSI research assistant professor Shawn Xu and his colleagues discovered that the "sixth sense" is present in the model organism *C. elegans*, a 1 millimeter nematode, and have been using worms to study proprioception.

They have recently discovered some neurons that possibly regulate stretch receptors which tell the body how to move. For patients with Parkinson's disease, these stretch receptors are thought to be involved in the loss of movement control, so finding a neuron that can tweak these signals could be a step towards developing new Parkinson's treatments.

Xu focuses his research on a superfamily of critical, but poorly understood, calcium-permeable ion channels, the TRP channels. Using *C. elegans*, he found a communication channel between neuron and muscle, TRP-4, which plays a role in movement. Xu's research shows that TRP-4 acts in a neuron called DVA that regulates how sensory-motor function is put together to produce movement. It controls locomotion, providing a unique mechanism whereby a single neuron can fine-tune motor activity.

"We are really studying neuronal signaling and the movement behavior," Xu said. "There are many channels and they are the same in worms and humans. "

The paper "A *C. elegans* stretch receptor neuron revealed by a mechanosensitive TRP channel homologue," by Wei Li, Zhaoyang Feng, Paul W. Sternberg, and X. Z. Shawn Xu, was published in the journal *Nature*, March 29, 2006.

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