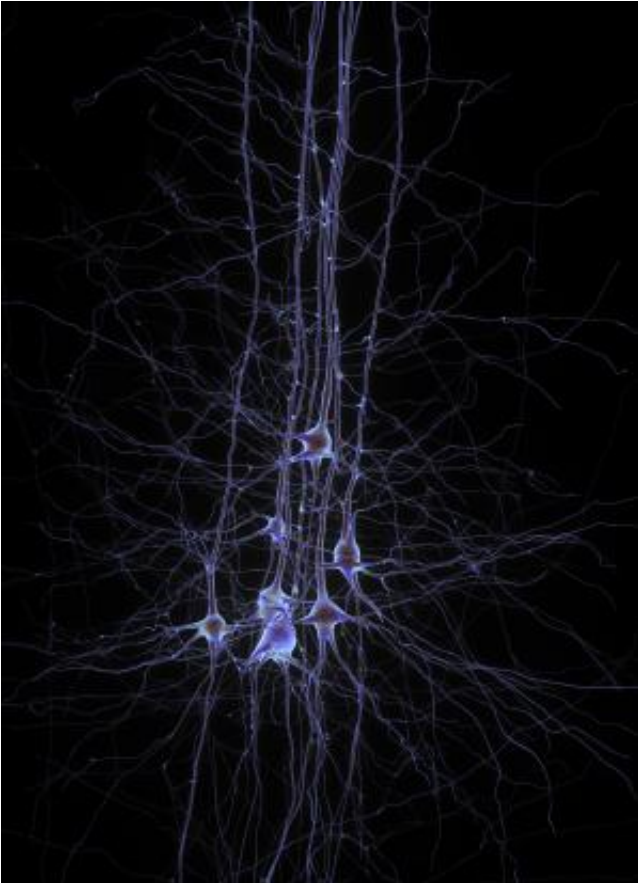


Researchers provide first peek at how neurons multitask

6 November 2014



This is a group of neurons. Credit: EPFL/Human Brain Project

Researchers at the University of Michigan have shown how a single neuron can perform multiple functions in a model organism, illuminating for the first time this fundamental biological mechanism and shedding light on the human brain.

Investigators in the lab of Shawn Xu at the Life Sciences Institute found that a neuron in *C. elegans*, a tiny worm with a simple nervous system used as a model for studying sensation, movement and other neurological function, regulates both the speed and direction in which the worm moves. The [individual neurons](#) can route information through

multiple downstream neural circuits, with each circuit controlling a specific behavioral output.

The findings are scheduled for online publication in the journal *Cell* on Nov. 6. The research is also featured on the cover.

"Understanding how the nervous system and genes lead to behavior is a fundamental question in neuroscience, and we wanted to figure out how *C. elegans* are able to perform a wide range of complex behaviors with their small nervous systems," Xu said.

The *C. elegans* [nervous system](#) contains 302 neurons.

"Scientists think that even though humans have billions of neurons, some perform multiple functions. Seeing the mechanism in worms will help to understand the [human brain](#)," Xu said.

The model neuron studied, AIY, regulates at least two distinct motor outputs: locomotion speed and direction-switch. AIY interacts with two circuits, one that is inhibitory and controls changes in the direction of the worm's movement, and a second that is excitatory and controls speed.

"It's important to note that these two circuits have connections with other neurons and may cross-talk with each other," Xu said. "Neuronal control of behavior is very complex."

Provided by University of Michigan

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