Wireless Micro LEDs Control Mouse Behavior

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A microscopic light-emitting diode device that controls the activity of neurons has given researchers wireless control over animal behavior. The tiny device, tested in mice, causes less damage than other methods used to deliver light into the brain, report researchers in Thursday's issue of *Science* [1], and it does not tether mice to a light source, enabling scientists to study behaviors more naturally than is normally possible.

Many groups of neuroscientists have turned to light-based control of neurons to study the neuronal basis of behavior. To control the brain cells, researchers use optogenetics, a method for genetically modifying neurons that allows them to be activated or silenced with flashes of light (see "Brain Control [2]").

Optogenetics has been used to study sleep, depression, and epilepsy (see "Decoding the Brain with Light [3]" and "Flipping on the Lights to Halt Seizures [4]") and it may one day even make it into patients (for example, see "Company Aims to Cure Blindness with Optogenetics [5]"). Many of these studies have used optic fibers or relatively large LEDs to control brain activity, which requires the animal in the study to be tethered to a laser or power source.

When Michael Bruchas [6], a neuroscientist at Washington University in St. Louis, began using optogenetics to study stress-related behaviors in mice, he was frustrated by the limits that tethered devices put on studies involving complex environments or multiple mice. So he teamed up with John Rogers [7], a materials scientist at the University of Illinois at Urbana-Champaign, and others, to develop a "device that has a very small ultrathin profile, is noninvasive, and can be controlled wirelessly," says Bruchas. "It gives you more power to study different circuits wired for specific behaviors. Animals can be in their home cage or interacting with another animal or running on a wheel."

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