

Neuroscientists create fiber-optic method of arresting epileptic seizures

24 January 2013

UC Irvine neuroscientists have developed a way to stop epileptic seizures with fiber-optic light signals, heralding a novel opportunity to treat the most severe manifestations of the brain disorder.

Although the study was carried out in mice, not humans, Soltesz said the work could lead to a better alternative to the currently available electrical stimulation devices.

Using a mouse model of [temporal lobe epilepsy](#), Ivan Soltesz, Chancellor's Professor and chair of anatomy & neurobiology, and colleagues created an EEG-based computer system that activates hair-thin optical strands implanted in the brain when it detects a real-time seizure.

Provided by University of California, Irvine

These fibers subsequently "turn on" specially expressed, light-sensitive proteins called opsins, which can either stimulate or inhibit specific neurons in select brain regions during seizures, depending on the type of opsin.

The researchers found that this process was able to arrest ongoing electrical seizure activity and reduce the incidence of severe "tonic-clonic" events.

"This approach is useful for understanding how seizures occur and how they can be stopped experimentally," Soltesz said. "In addition, clinical efforts that affect a minimum number of cells and only at the time of a seizure may someday overcome many of the side effects and limitations of currently available treatment options."

Study results appear online in *Nature Communications*.

More than 3 million Americans suffer from epilepsy, a condition of recurrent spontaneous seizures that occur unpredictably, often cause changes in consciousness, and can preclude normal activities such as driving and working. In at least 40 percent of patients, seizures cannot be controlled with existing drugs, and even in those whose seizures are well controlled, the treatments can have major cognitive side effects.

APA citation: Neuroscientists create fiber-optic method of arresting epileptic seizures (2013, January 24) retrieved 5 October 2022 from <https://medicalxpress.com/news/2013-01-neuroscientists-fiber-optic-method-epileptic-seizures.html>

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