

Mayo Clinic finds seizure generation in brain is isolated from surrounding brain regions

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Mayo Clinic researchers found that the part of the brain generating seizures in individuals with epilepsy is functionally isolated from surrounding brain regions. The researchers hope this finding could be a clinical biomarker to help identify individuals with abnormal brain function. This study was presented at the American Epilepsy Society's annual meeting in San Antonio on Dec. 4.

Epilepsy is a disorder characterized by the occurrence of two or more [seizures](#). It affects almost 3 million Americans.

"The synchronization of local and distributed neuronal assemblies underlies fundamental brain processes like perception, learning and cognition," says Gregory Worrell, M.D., Ph.D., a Mayo Clinic epileptologist and an author of this study. "In neurological disease, neuronal synchrony can be altered, and in epilepsy the synchrony plays an important role in the generation of seizures."

Mayo Clinic researchers investigated neuronal synchrony by studying intracranial EEG (electroencephalogram) recordings from patients with epilepsy and control subjects with facial pain. Researchers discovered that the control patients had greater average synchrony than patients with focal epilepsy (when seizures are produced in a small part of the brain, not the entire brain). When implanted electrode pairs bridged seizure-generating brain and other brain regions, the synchrony was significantly less than between other electrode pairs in the epileptic brain and the control brain. The team also found that with greater activity in the

seizure-generating region, there was less synchrony with neighboring tissue outside that region.

"Our study shows us that the part of the brain generating seizures is isolated from the surrounding [brain regions](#)," says Dr. Worrell. "This finding could serve as a clinical [biomarker](#) of an abnormal brain, and it can also be useful in epilepsy surgery and [brain stimulation](#) treatments, as well as helping us understand how seizures are generated."

Provided by Mayo Clinic

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