

Development of epileptic seizure models with the use of Optogenetics: shedding light on the epileptic seizure mechanism

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A research group led by Professors Hajime Mushiake of the Department of Physiology, Teiji Tominaga of the Department of Neurosurgery, and Nobukazu Nakasato of the Department of Epileptology at the Tohoku University Graduate School of Medicine invented a highly reproducible in vivo epileptic seizure model by applying repetitive pulse photo stimulation to a rodent hippocampus expressing channelrhodopsin-2. Through the application of light, the electrophysiological process for generation and propagation of epileptic seizures can be directly observed. With the use of this seizure model, they revealed that information transfer along the septo-temporal (ST) axis of hippocampus plays an important role in the development of epileptic seizures. This research with the use of optogenetics, which refers to the integration of optics and genetics, is expected to reveal mechanisms of epileptic seizures and to bring a breakthrough for the development of new epilepsy treatment.

The results of this research were published in the electronic version of the journal PLOS ONE. The paper's title is "Optogenetically Induced Seizure and the Longitudinal Hippocampal Network Dynamics."

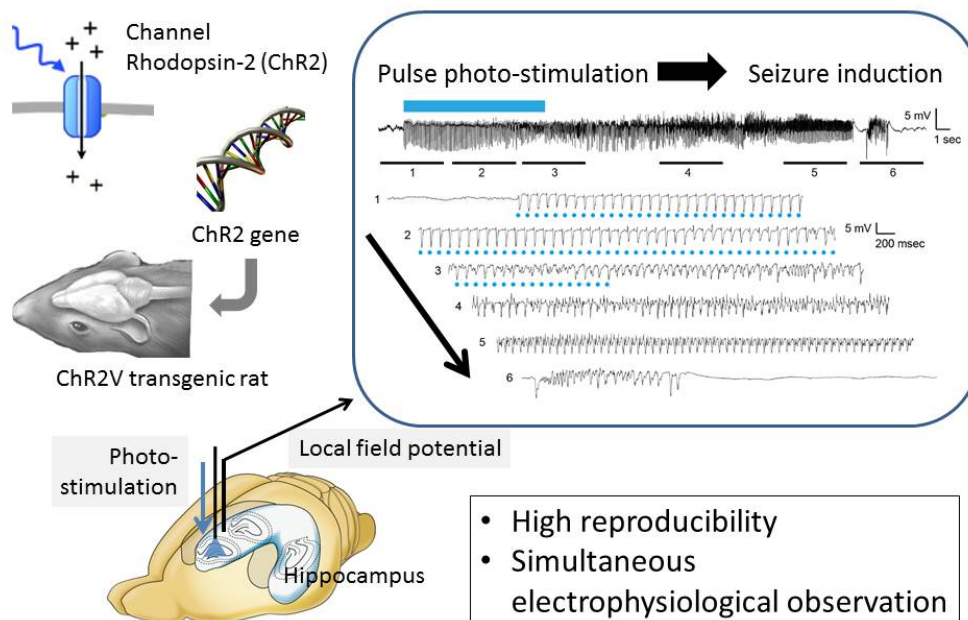


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Optogenetically Induced Seizure Model



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"Optogenetically induced seizure and the longitudinal hippocampal network dynamics."

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