

Researchers find an important clue to potential treatments for absence seizures

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A group of Korean researchers has succeeded in revealing a principle mechanism of a neural network in the human brain, which will provide an important clue to potential treatments for absence seizures.

Absence seizures are believed to be elicited by T-type calcium channels in the thalamic reticular nucleus of the brain that regulate influxes of calcium. These channels enable thalamic reticular nucleus neurons to generate burst firing, leading the neurons to enter a hyper-excited state.

In order to identify the relationship between burst firing and [absence seizures](#), the researchers conducted an experiment to induce absence seizures in mice using gene targeting techniques to delete the T-type calcium channel CaV3.3. The results showed that mice that received a complete genetic deletion of the T-type calcium channel, which in turn suppressed burst firing in the thalamic reticular nucleus, exhibited an increased frequency of absence seizures.

Moreover, the researchers observed for the first time ever that tonic firing also increased in such mice. The study was the first to discover that tonic firing plays a key role in the induction of absence seizure, which contradicts the existing hypothesis and carries significant implications for absence seizure treatment research.

The study calls into question the role of the T-type [calcium channel](#) in the reticular thalamus, and is expected to provide an important theoretical foundation for understanding its role in the mechanism of

absence seizures, as well as developing effective treatment methods for absence epilepsy.

The findings were published online, July 28, in the prestigious journal, the *Proceedings of the National Academy of Sciences* of the United States of America (*PNAS*).

More information: Seung Eun Lee, Jaekwang Lee, Charles Latchoumane, Boyoung Lee, Soo-Jin Oh, Zahangir Alam Saud, Cheongdahm Park, Ning Sun, Eunji Cheong, Chien-Chang Chen, Eui-Ju Choi, C. Justin Lee, and Hee-Sup Shin. "Rebound burst firing in the reticular thalamus is not essential for pharmacological absence seizures in mice." *Proc. Natl. Acad. Sci.* August 12, 2014 vol. 111 no. 32 11828-11833 | [DOI: 10.1073/pnas.1408609111](https://doi.org/10.1073/pnas.1408609111)

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