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Control of absence epilepsy seizures in specific relay nuclei of thalamus

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Highlights

- In this paper, we first used a classic basal ganglia-corticothalamic model(BGCT) to study the onset and control mechanism of absence epilepsy in specific relay nuclei (SRN) of thalamus.
- It was found that the seizure state may appear in SRN by turning the coupling strength -v_{sr} and signal transmission delay τ on the route "Thalamic reticular nuclei (TRN) of thalamus $\rightarrow$ SRN ".
- With increasing of -v_{sr}, the seizure state appeared two times, and its onset mechanism has not been discussed in previous studies.
- The seizure activity can be well controlled by adjusting the activation level of the substantia nigra pars reticulata (SNr) in basal ganglia, and the interesting bidirectional regulation phenomenon appeared, the mechanism of which is also different from some previous theoretical studies.
- The mechanism obtained can also explain the onset and control of the poly-spikes slow wave appeared in SRN by turning τ to large enough.

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