Shigeki Sadahiro, J Child Adolesc Behav 2018, Volume 6
DOI: 10.4172/2375-4494-C1-004

Shigeki Sadahiro
Osaka Neurosurgical Hospital, Japan

A hypothesis of series resonance in the white matter for understanding the mechanism of spike-wave seizures

Background & Aim: Generalized epilepsy is accompanied by large-amplitude synchronized Spike-Wave Discharges (SWDs) on electroencephalography. Although some research groups continue to contend that both the thalamus and the cortex are involved in typical SWDs, the onset of SWDs is likely to vary. It remains unknown how most parts of the brain are synchronously and rapidly involved. To clarify this, a phenomenon is followed by hypothesizing a series resonance in an equivalent electric circuit for the white matter. This hypothesis is based on the ideas that the electric conduction along an axon is due to the displacement current and that the unit structure composed of a node of Ranvier and the next node can be regarded as a capacitor or an inductor, depending on the geometry and the substance around the nodes.

Method: The flash-visual evoked potentials at various flash repetition rates were measured in patients with generalized epilepsy and compared with those for healthy controls and patients with focal epilepsy.

Result: The P_{100} amplitude plotted against the flash repetition rate had a maximum peak at a certain flash repetition rate for each of the patients with generalized epilepsy, whereas there was no such peak for the controls or the patients with focal epilepsy.

Conclusion: The observation of a peak in the P_{100} amplitude at a certain repetition rate was inferred to reflect the series resonance phenomenon in the white matter. Patients with generalized epilepsy have large regions of white matter with similar resonance frequencies.

Biography

Shigeki Sadahiro has completed his studies in Physics from the University of Tokyo and joined Mitsubishi Electric as an Engineer helping to develop semiconductor technology. He is working as Neurologist at Osaka University Medical School. He has been working aggressively in the field of epilepsy for the last 10 years and has found it a challenge to understand how most parts of the brain are synchronously and rapidly involved in generalized epilepsy.

estate0360@yahoo.co.jp

Notes: