

Project 1.12 Dispersed mossy fiber synapses as a possible cause of cognitive dysfunctions in epileptiform neuropsychiatric conditions

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Background:

Cumulating experimental data indicates the correlation between temporal lobe epilepsy and neuropsychiatric disorders which might suggest their common etiology. A crucial role in this correlation is played by hippocampus, a brain structure responsible for cognition and seizure origin in temporal lobe. Synapses are interneuronal connections ensuring communication through the different classes of receptors. Various biological mechanisms may contribute to the common etiology of temporal lobe epilepsy and neuropsychiatric disorders, nevertheless, scientific investigations are mostly concentrated on synaptic dysfunctions. Our experimental data obtained during animal research indicates that synaptopathy related to a very specialized group of hippocampal neurons is implicated in the development of temporal lobe epilepsy and comorbid neuropsychiatric dysfunctions. To investigate the aforementioned phenomenon we intend to combine distinct experimental methods derived from electrophysiology, neuroanatomy, molecular biology, behavioral studies, biological interactions and other fields. Moreover, part of the experiments will be performed in collaboration with clinicians on samples from obtained patients. Realization of this project will not only increase our knowledge about function of neuronal connections but will also help us to understand how synaptopathies lead to the brain malfunction. The undertaken study fits into frames of most challenging research issues looking for biological mechanism underlying neurological impairments.

Aim:

The general objective of the presented project is to investigate the physiological consequence of giant mossy fiber boutons dispersion -an underrecognized phenomenon that can be associated with spectrum of epileptiform neuropsychiatric dysfunctions.

Requirements:

- Master degree in biology, biotechnology or related fields, obtained before the date of project start,
- documented scientific activity (conferences, internships, awards, scholarships),
- high motivation for supervised research,
- experience in animal research (mouse) would be an advantage,
- very good English communication skills.