

BARNABÁS ÁKOS LAKOS



National Scientists Academy, 2nd year

University of Szeged,
Albert Szent-Györgyi Medical School, 3rd year

YEAR OF BIRTH:

2001

FORMER SZENT-GYÖRGYI PUPIL:

no

SZENT-GYÖRGYI MENTOR:

Antal Berenyi

SPECIALIZATION:

Neuroscience

SECONDARY SCHOOL:

SZTE Gyakorló Gimnázium
és Általános Iskola

NAME OF TEACHER:

István Csigér

LANGUAGES:

English/advanced
French/intermediate

IMPORTANCE, AIMS AND POSSIBLE OUTCOME OF RESEARCH

The sharp wave ripple (SWR) oscillations of the hippocampus play a crucial role in the synchronization of healthy brain activities, and in the development of pathological activities. Stimulus tied to the SWRs is shown to influence the development of certain brain disorders (e.g., various forms of anxiety), and may play a role in the treatment of epileptic seizures. Existing studies detected SWRs and delivered stimuli to deep brain areas through penetrating electrodes, limiting human therapeutic applicability.

The aim of our work is to find cortical activity patterns detectable by non-invasive EEG scalp electrodes, which can effectively substitute the hippocampal SWRs in stimulus timing. To achieve this goal, besides of analyzing the signals of specific electrodes (e.g., sleep-spindles, or slow waves) we will also search for distributive patterns in the high-resolution space time representation of the signals of multiple electrodes using the methods of modern data-science and 'big-data' analysis.

We will also explore if the novel transcranial electrical stimulation method (ISP - intersectional short pulse stimulation) developed and patented by our research group can target the desired deep brain target areas and become an alternative to invasive deep brain stimulation electrodes.

We will also search for cortical targets as alternatives to the already identified deep brain targets, making stimulation easier. A possible candidate is the stimulation of the ventromedial prefrontal cortex (or the infralimbic cortex in rodents) instead of the deep brain reward systems (e.g., ventral tegmental area), which can be an important clinical target in the treatment of anxiety-based disorders and posttraumatic stress disorder (PTSD).

AMBITIONS AND CAREER GOALS

During my university years I want to be a useful member of my research group. In two years, I will be responsible for a subtask of the project including the animal experimentation and analysis. After receiving my degree, I want to continue my education in a PhD program. My long-term goal is to become an internationally respected member of the scientific community.

HONORS AND PRIZES

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PUBLICATIONS

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