

Epilepsy is a common neurological disorder mainly characterized by bursts of neuronal activity that give rise to general convulsions. According to the report of World Health Organization, this is one of the most prevalent neurological dysfunctions with estimated morbidity of 0.4-1% of the human population, providing tens of millions of cases worldwide. The most frequent form of human epilepsy is temporal lobe epilepsy, which is refractory to the currently available pharmacotherapies in 40% of patients. This makes the pathogenesis of temporal lobe epilepsy one of the most important subjects of interests in science and medication. A variety of biological mechanisms may play a role in etiology of temporal lobe epilepsy however, investigations mostly concentrate on the pathologies within synapses, which are sites of of interneuronal contacts providing communication through the different classes of receptors. Our recent experimental data from studies on animals implicates aberrations in function and localization of a very specialized subpopulation of synaptic receptors as one of the possible factors responsible for the development of temporal lobe epilepsy. We assume that this synaptic dysfunction might comprise a substantial epileptogenic factor in hippocampus -the brain structure which is critical for the development of the disorder. In order to address the hypothesis experimentally, the undertaken project bases on broad spectrum of multidisciplinary methods. We will bring together classical and modern techniques originating from electrophysiology, neuroanatomy, molecular biology, interactomics and others. Realisation of this project will not only strengthen our knowledge about basic biological mechanism in the brain but will also help us to understand how their aberrations lead to the appearance of temporal lobe epilepsy. Accordingly this project will provide a handful of significant results with even potential clinical perspective. In this context, the project fits perfectly into the framework of the most pressing research issues still looking for the biological mechanisms that underlay brain function and human neurological disorders.