

## The role of subplate neurons and interstitial neurons in pathogenesis of epilepsy

P. Nimac Kozina<sup>1</sup>, G. Sedmak<sup>2</sup>

<sup>1</sup>*Department of Neurology, University Hospital Centre Zagreb, University of Zagreb, School of Medicine, Referral Centre of the Ministry of Health of the Republic of Croatia for Epilepsy, Croatia*

<sup>2</sup>*Laboratory for developmental molecular neurobiology, Croatian Institute for Brain Research, University of Zagreb, School of Medicine, Croatia*

**Introduction:** Interstitial neurons of white matter are a large, but insufficiently explored group of neurons located beneath the cerebral cortex, between the bundles of white matter. Exact role of interstitial neurons in the functioning of the cerebral cortex has not been proven yet. Interestingly, in many neurological and psychiatric disorders the number, distribution and density of interstitial neurons is altered. Epilepsy is one of disorders where alterations of interstitial neurons have been observed. In the brain of people with epilepsy, it is often possible to find an increased number of interstitial neurons. According to classical authors, these neurons are cortical neurons that are not located in their correct position during migration. Although there is no single evidence that increased number of interstitial neurons in the white matter is the consequence of disorder during migration of neurons, with the exception of clearly cited cortical malformations due to similar disorders (e.g. focal cortical dysplasia), today's prevailing opinion is that those are residual and aberrantly located cortical neurons. **Hypothesis :** The hypothesis of the study is that the increased number of interstitial neurons in patients with epilepsy has been the consequence of the developmental disorder and the elimination of subplate neurons during development, not consequence of disorder during migration of cortical neurons. **Aims:** The aim of this study is to determine the molecular phenotype of interstitial neurons in areas of importance to epilepsy, in the median part of the temporal lobe. Analysis of brain samples of temporal lobe obtained after the operation of patients with pharmacoresistant epilepsy will be compared with healthy controls. Furthermore, we will analyze the developmental origin of neurons located in the white matter to determine whether they belong to the sub-population of the subplate neurons or belong to the sub-populations of the cortical neurons.