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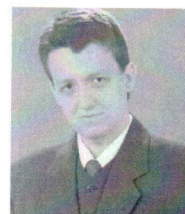
Morphological changes and behavioral profile of seizures in pilocarpine-induced temporal lobe epilepsy

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During the development of temporal lobe epilepsy the reorganization of the neuronal network, changes in the number and function of individual neurons and the consecutive modification of the electrical properties of both the cells and the network leads to the synchronized firing of a large number of neurons and the reoccurring seizures. The morphological and functional changes inherent to the disease as well as their timing are only partially described. Our goal is to deploy a complex method to study the timing of the morphofunctional changes, including behavioral and seizure pattern analysis, electrophysiological measurements as well as stereological counting of cells identified in immunolabelled sections. We induced epilepsy in Wistar rats by systemic administration of Pilocarpine, thus inducing status epilepticus with variable severity. The initial seizures were stopped with Diazepam. The animals were continuously monitored using a video system and later were sacrificed during several stages of the epileptogenesis (before and after the appearance of the spontaneous seizures). 60 µm thick sections were cut from the brain and Nissl staining as well as triple-immuno-labeling was performed. In order to identify perisomatic inhibitory interneurons we used parvalbumin (PV), for dendritic inhibition we labeled with somatostatine (SOM) and neuropeptide Y (NPY). In order to identify the newly described ivy cells we also labeled with NOS. The pyramidal cells of CA1 area almost completely disappeared; also the thickness of all layers in both CA1 and CA3 regions was reduced. The seizure pattern and the hippocampal sclerosis could not be correlated. The density of perisomatic and bistratified interneurons did not change; this shows a maintained basal inhibition. The loss of O-LM cells may explain the hyperexcitability of the network. The loss of ivy cells correlated with the seizure pattern confirms their protective role. This work was supported by CIGCS 12/2013.