P0643 / #2316

Topic: AS06 Neural Excitability, Synapses and Plasticity

THE IMPACT OF CYTOPLASMIC POLYADENYLATION ON ELECTROPHYSIOLOGICAL PROPERTIES OF HIPPOCAMPAL NEURONES

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GLD2 is a cytoplasmic poly(A) polymerase. It catalyzes the process of polyadenylation, an elongation of poly(A) tails at the 3' ends of mRNA particles. This process occurs mainly in the nucleus and is considered to increase mRNA stability. However, it can also occur in the cytoplasm of neurons. GLD2 is expressed in olfactory bulb, cortex, cerebellum and hippocampus of a mouse brain. However, whether this enzyme's activity may affect any neuronal function remains unknown. Here we have analyzed passive membrane properties and membrane excitability of CA1 pyramidal neurons in acute hippocampal slices of wild-type and an in-house generated GLD2 KO mice. We found that GLD2 KO neurons exhibited increased membrane resistance and number of evoked action potentials compared to wild-type neurons. In addition, GLD2 KO neurons had reduced membrane capacitance. Next, we have performed recordings of evoked field potentials in Sch-CA1 projection in acute hippocampal slices. In agreement with patch-clamp results, GLD2 KO mice exhibited enlarged amplitude of population spike signal while excitatory postsynaptic potentials were unaltered. In conclusion, lack of GLD2 resulted in increased responsiveness of neuronal membrane to excitation, thus making CA1 pyramidal neurons become more excitable. Cytoplasmic polyadenylation mediated by GLD2 may play a regulatory mechanism for local translation in neurons and affect CA1 hippocampal neurons' function. Supported by GRIEG 2019/34/H/NZ3/00733 (Norway Grants).

Declaration of Interest Statement: None

https://doi.org/10.1016/j.ibneur.2023.08.648

P0644 / #3160

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THE EFFECT OF CANAGLIFLOZIN ON HIPPOCAMPAL DENDRITE MORPHOLOGY IN A MODEL OF ALZHEIMER'S DISEASE INDUCED BY INTRACEREBROVENTRICULAR INJECTION OF STREPTOZOTOCIN

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Introduction: Streptozotocin is used for experimental Alzheimer's disease model. Canagliflozin (an anticholinesterase and SGLT inhibitor), a new oral antidiabetic, has an effect on cognitive damage and biochemical parameters in the Alzheimer's disease model. The aim of the study is to examine the effect of canagliflozin on hippocampal dendrite morphology in a model of Alzheimer's disease induced by intracerebroventricular injection of streptozotocin.

Material and Methods: The Wistar rats were induced by intracerebroventricular injection of streptozotocin and divided two groups, control group enjected with DMSO for 7 days (n = 5) and treatment group enjected by canagliflozin for 7 days (n = 5). Rats were sacrificed by the transcardial perfusion method. Brain tissues were stained using the FD Rapid GolgiStain Kit. Coronal sections were obtained with a cryostat. Pyramidal neurons in the CA1 region of the hippocampus were examined using a light microscope and Neurolucida 360 software. Branching and total length of dendrites were analyzed. Statistical analysis was performed using GraphPad Prism and an unpaired t test.

Results: In the preliminary study results, statistically,the number of dendrite segments (dendritic arborization) ($p = 0.025$), the total dendrite length (μm) ($p = ,0.029$), the number of primary dendrites ($p = 0.018$) of the hippocampus were higher in the treatment group compared to the DMSO control group. **Conclusions** Treatment with canagliflozin has shown an increasing effect on dendrite length and arborization. This study was supported by TÜBİTAK (The Scientific and Technological Research Council of Türkiye) (Project No: 1919B012214480).

Declaration of Interest Statement: None

https://doi.org/10.1016/j.ibneur.2023.08.649