МАТЕРИАЛЫ КОНФЕРЕНЦИИ И ШКОЛЫ

PROTECTIVE EFFECT OF GLIBENCLAMIDE IN HIPPOCAMPAL AND BASOLATERAL AMYGDALA NEURONS

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Excess dietary fructose intake causes metabolic syndrome and increased risk of type 2 diabetes and diabetic neuropathy. In this study, the characteristic features of the metabolic effects of dietary fructose on synaptic plasticity in hippocampal neurons and basolateral amygdala as well as neuroprotective effects of Glibenclamide (a sulfonylurease drug used to treat type 2 diabetes) are revealed. We have done in vivo extracellular studies of spike activity of hippocampal neurons during high-frequency stimulation (HFS) of the entorhinal cortex, as well as basolateral amygdala neurons during HFS of hippocampus in rats fed on fructose-rich (20% body weight/volume) diet (for 8 weeks). In hippocampal neurons an increase in the percentage of excitation and a decrease in depression during HFS, along with an increased intensity of responses during HFS and a lower level of peristimulus spiking were observed. In the neurons of amygdala, the dominance of depression during HFS and an equal balance of excitation/depression for post-stimulus time are recorded along with a reduced intensity of excitation and depression to HFS. In condition of fructose-induced disrupted neuronal short-term plasticity Glibenclamide (per oral 5 mg/kg/day during 3 weeks) modulates the synaptic activity of the entorhinal cortex-hippocampus-amygdala network by shifting the percentage balance in favor of depressor types of responses during HFS and an increase in their intensity. After a single injection of a therapeutic dose of Glibenclamide, an increase in excitatory responses in the hippocampus and amygdala was revealed, suggesting that Glibenclamide adapts neural networks of the brain by activation of the excitatory neurotransmission system. Our findings expose changes that define diabetic neuropathy and offer new perspectives on mechanisms to prioritize for diabetic neuropathy sulfonylurease therapeutics.