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Researches Classified – Monograph Awards

Influence of lithium in neuron-glia interaction in primary hippocampal cell culturing

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Recently, special attention has been given to the possible neuroprotective effects of lithium, especially by the discovery of its regulatory effects on pro and anti-apoptotic proteins. Lithium substantially increases the cytoprotective proteins expression in the central nervous system, both in rat cortex and in human cells of neuronal origin. In addition to neuroprotective actions, it aids in the regeneration of axons in the central nervous system of mammals. Lithium negatively regulates the expression and activity of enzymes that exert important functions in cerebral homeostasis: synaptic plasticity, neurogenesis, and phosphorylation of tau protein. Microglia is known for its importance in neuropathologies. However, under physiological conditions, such immune cells interact actively with neurons, being able to modulate the fate and functions of the synapses. Such ability of microglial cells suggests the consequences of changes in microglial phenotype under pathological conditions, which makes it relevant to understand the interaction between microglial and other developing brain cells and their influence on the formation of neuronal and synaptic networks.

The current work aims to identify the main pathway of neuronal-glia integration activated by chronic treatment with lithium (0.02mM; 0.2mM and 2mM) in hippocampal neurons, exploring the use of bioinformatics tools in microarray data.

Treatment of primary hippocampal neurons with lithium changed the genes related to different neuroprotection pathways at the highest therapeutic dose (2mM).

There was dissociation between the therapeutic and sub therapeutic dose of lithium in neuroprotection. Therefore, treatment at therapeutic doses (2mM) modified different signaling pathways when compared to the sub-therapeutic dose (0.02 and 0.2mM).

Keywords: Neuronal protection; Hippocampal; Lithium; Neuron-glia.