Using different types of viability tests and images, obtained by light and fluorescent microscopy, we can conclude that MNPs-PAH do not adversely effect on the survival of cells and formation of spheroids from cell cultures. Spheroids formed from magnetic cells demonstrated the ability to move under the influence of a constant magnetic field.

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MAGNETIC RESONANCE SPECTROSCOPY OF THE ISCHEMIC BRAIN UNDER LITHIUM TREATMENT INDICATES CHANGES IN METABOLITES

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In the last two decades, a growing body of evidence has shown that lithium has several neuroprotective effects. Lithium is a classic drug for the treatment of bipolar disorder. Most neuroprotective effects of lithium were shown only with pretreatment and prolonged use, for example, protecting against glutamate-induced apoptosis and ischemia-induced brain damage. The major mechanism underlying lithium-induced neuroprotection is inhibition of glycogen synthase kinase-3β, however, the certain metabolic changes mediated by lithium is still unclear. At the same time, many studies indicate mitochondrial dysfunction in stroke. Along these lines, in vivo analysis of metabolites associated with mitochondrial function may provide the key to understanding the mechanisms of brain damage and neuroprotection by lithium.

In this study, 1H-MRS was employed to examine the metabolic changes in the cortex and thalamus during the acute phase of rat brain ischemia/reperfusion and those after lithium treatment.

1H-MRS used for detecting the ratios of Cho/Cr, Glu/Cr, Lac/Cr, mI/Cr, NAA/Cr and Lip0.9/Cr at 1, 2, 3 and 24 h after occlusion of the middle cerebral artery (MCAO) revealed that significant metabolic changes in the infarct area were obvious beginning at 1 h after MCAO for lactate, myo-inositol and N-acetyl aspartate. 1H-MR spectra showed significant elevation in the lactate and myo-inositol and a marked decrease in N-acetyl aspartate 24 h after MCAO. In a post-MCAo period we detected decreased spectra of two metabolites – at 2 and 3 h time points for glutamate and at only 2 h time point for choline. At 24 h after MCAO, the Lip0.9/Cr ratio in the vehicle group was significantly higher than that in the control group. Quantitative analysis of 1H-MRS in the group treated by lithium revealed a persistent decrease of lactate levels after the occlusion onset compared to vehicle group at every time point explored. In addition, in lithium-treated animals when compared with a vehicle group, N-acetyl aspartate levels in the damaged area were elevated starting from 2 h of a post-ischemic period and kept high until 24 h.

Therefore using this approach one can estimate the severity of brain damage and effectiveness of applied therapy. In that way we were able to show lithium-mediated neuroprotection, associated with preserving of mitochondrial function.

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EVALUATION OF TOXIC EFFECTS OF SILVER NANOPARTICLES

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Silver nanoparticles are one of the most promising types of metal nanoparticles. Their production and scope is constantly expanding, which can lead to a negative impact on human health and the environment, in connection with the evaluation of the toxic effect of nanoparticles of different chemical composition and structure is actual problem.

In this work we have investigated the toxicity of silver nanoparticles stabilized with polyallylamine hydrochloride (PAH). As target cells were selected human lung carcinoma cells A549.