Anotation

The study of effective remedies against neurodegenerative disorders showed neuroprotective nature of flavonoids - an antioxidant of plant origin. Quercetin is one of the widespread representatives of this group,but the use of Quercetin has been limited due to it poor bioavailability. The modern approach to solve problem is usage of nanoparticles (NP). It is shown that nanoparticles protect, control the release and increase the influence of bioactive compounds to the target area.nanoparticles can ecrose blood-brain barrier (BBB). In case of using magnetic iron oxide nanoparticles (MNP) as a drug delivery system, the orientation and location of particles could be controlled by external magnetic field, which is characterized by good bioavailability. Thus, it was suggested that exposure of the magnetic field to the brain could have impact on the transport of drug-loaded MNP.

The aim of our study was to investigate the effects of intravenous injected Quercetin-loaded magnetic iron oxide nanoparticles (Q-MNP) on behavioral characteristics unilateral exposure of the magnetic field (1 tesla, 1 hour) on the brain (temporal lobe projection) and correlatives of morfological identification.

Experiments were conducted on wild type white laboratory rats (100-120gr). Rats behavioral experiments were performed in the open field and T-maze tests. Q-MNPs were injected in the tail vena under unilateral external magnetic field (1 tesla) exposure to the temporal lobe projection of the rat brain.

In morfological experimental the administration of the Q-MNP were made after 30 minutes of the magnetic field exposure, and the extirpation of the brain were performed after 80-120 min of the magnetic field removal. Perl's Prussian blue stain was used to determine the iron content in brain structures.

The brain slices from two groups of animals with the right and the left side exposure of the magnetic field were prepared for visualization of the iron tabs and evaluation of their amount. Iron inserts were counted in the CA1/CA3 fields of the hippocampus, in the dentate gyrus and neocortex. In order to determine the influence of magnetic field on the target delivery of Q-MNP, comparison analyses between the numbers of iron inserts in the treated and untreated site were performed. For statistical analyses of the obtained data software PRIZM was used.

The behavioral demonstrated that magnetic field, as well as MNP itself, does not change the behavior of animals in the open field. However Quercetin and Q-MNN improve the learning ability of

the rats, which was reflected as a statistically significant increase of the number of correct reaction in T-maze test. There is no difference between the data of Quercetin and the Q-MNP series.

The Morfological experiments showed that the number of iron inserts are significantly higher in the magnetic field-exposure site compare with the untreated contralateral site, suggesting that the exposure of magnetic field improves target-delivery of the Quercetin-loaded MNP to the brain.