Influence of quercetin-loaded iron nanoparticles on kainic acid-induced epileptiform discharges in the hippocampus

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Annotation

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The purpose of the research was to determine quercetin and quercetin-loaded magnetic nanoparticles (Q-MNPs) effects of baseline and evoked responses generated by an intra hippocampal application of kainic acid (KA), in the CA1 field of the hippocampus.

At the stereotaxic chamber metal tripolar electrodes (constatntan) were implanted in the ketamineanesthetized wild type laboratory rats bilaterally for the unipolar registration and bipolar stimulation of the neuronal activity of the hippocampus. Single and paired-pulse electrical stimulation protocol were administrated in the experiment. After registering the baseline activity, in order to generate epileptiform activity kainic acid (KA) injection was performed 5 times unilaterally in the hippocampus (CA3 field of the hippocampus). To evaluate the effect of quercetin and quercetin-loaded magnetic nanoparticles on kainite-induced epileptiform activity tail vein injection of quercetin/Q-MNP were carried under condition of 60 min an external static magnetic field(1 Tesla). The registration and analysis of neuronal activity of the hippocampus were done using a computer program Chart 5.5. The software PRIZM was used for statistical analyses.

The experiments showed that Preliminary administration of Q-MNP, but not quercetin statically reliably reduced the frequency and amplitudes of the epileptiform discharges caused by intrahippocampal injection of the KA. Quercetin and an external static magnetic field independently did not change amplitudes and frequency indices of the epileptiform activity in the hippocampus. quercetin-loaded magnetic nanoparticles induced depression of single evoked responses and changes in strength of PP-facilitation. This is an indicator of the impact on the presynaptic locus of Q-MNP and It is likely to cause blockade of the presynaptic release of glutamate transmission.