

The effects of intracerebral administration of orexins on epileptiform activity induced by electrical stimulation of the CA1 field of the hippocampus in rats

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Orexinergic neurons, the expression of which is marked in the lateral hypothalamus, gives extensive projections throughout the brain and play an important role in both physiological and pathophysiological processes in the brain. The role of orexinergic system in the regulation of synaptic plasticity in the hippocampus is well known [5,6,7], but there is controversy regarding the involvement of this system in pathophysiology of epilepsy [1,2,3,4]. Our previous experiments have shown that orexin-A inhibits pharmacologically induced multiple discharges of population spike in the CA1 field of hippocampal slices, induces a long-term depression of isolated NMDA responses and modulates the activity of spontaneous bursting neurons in the CA3 field of the hippocampus [1,2].

The aim of the present work was to investigate the effects of intracerebral administration of orexins on the electrophysiological characteristics of epileptiform discharges induced by high-frequency electrical stimulation of the CA1 field of the hippocampus.

Our results demonstrate that intracerebral injection of orexin-A increases the threshold of epileptiform discharges induced by high-frequency electrical stimulation and reduces the duration of high-frequency activity. Intraventricular and cortical application of orexin-A also reduces the amplitude/frequency characteristics of the epileptiform discharges.

The noted effects of orexin-A have shown its antiepileptic influence.

References

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