Modulation and role of brain neurotransmitters in pilocarpine-induced seizures in the rat

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Introduction

➤Epilepsy, a group of serious disorders of the central nervous system characterized by a predisposition to recurrent unprovoked seizures due to abnormal excessive synchronous neural activity. Animal models of pilocarpine-induced seizures have been employed to demonstrate that ongoing epileptic activity in the brain can affect both excitatory and inhibitory synapses and thus neuronal plasticity. Neurotransmitters play a vital role in the functioning of brain.

Aim of the study

➤Our study aimed to investigate the changes in brain neurotransmitters in Wistar rat models of pilocarpine-induced seizures.

Materials and Methods

➤Total 75 animals of pilocarpine-induced seizures models for epilepsy were studied. Behavioral, electroencephalographic and morphological changes induced by systemic administration of pilocarpine hydrochloride were studied in 3–90-day-old rats. Pilocarpine, 100, 200 and 380 mg/kg, presented a characteristic array of behavioral patterns in developing rats. Determination of brain norepinephrine, Gamma-aminobutyric acid (GABA), dopamine and serotonin was carried out using high performance liquid chromatography (HPLC) system, Agilent technologies 1100 series.

Results & Discussion

The mean values of brain norepinephrine, dopamine and serotonin levels in pilocarpine-induced seizures rat brain were significantly increased compared to control group, which consequently, may reduce seizure susceptibility and epilepsy comorbidities. There was a singinificant decrease in Gamma-aminobutyric acid (GABA) values in treatment group compared to control.

The mean values of brain norepinephrine, dopamine, glutamate, GABA and serotonin levels in MPTP rat models brain were significantly decreased compared to control group, which consequently, may changes motor and non-motor symptoms in experimental ratmodels. There was a singinificant alternations in adenosine and neuropeptides values in treatment group compared to control. **1. Control, 2. norepinephrine, 3. dopamine, 4. serotonin, 5. GABA.**

Conclusion

☐Neurotransmitters play a vital role in brain functioning and also have important function in epilepsy status.