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Poster Presentation

Alterations of Electrophysiological Activity of Cerebellar Pukinje Cells of Rats Under Harmaline Toxicity

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Abstract

Introduction: Beta-carboline alkaloids of *P. harmala* are shown to have immune-modulatory effects in several studies. Extracts of this plant have significant anti-inflammatory effect via the inhibition of some inflammatory mediators including PGE۲ and TNF-α. In postmortem studies, structural alterations to the cerebellum have been recognized, including Purkinje cell loss being reported in some studies suggesting that Purkinje cell deterioration may be dominant to pathogenesis of this toxicity. In this study, we aimed to test the effects of this agent on electrophysiological properties of purkinje cells by whole cell patch clamp recording method. **Materials and Methods:** To test the effects of the harmaline, rats aged 4 weeks selected and electrophysiological test was performed on cerebellar slices by whole cell patch-clamp recording. Experimental groups including, control (saline 0.5 ml) and harmaline (30mg/kg). For investigating cells electrophysiological properties, we designed three sets of experiments including spontaneous activity, positive and negative evoked charges. After the animals deeply anesthetized, the Vermises of their cerebellum were dissected and sliced, then under video microscopy, the whole cell patch-clamp was performed and spontaneous activity as well as positive and negative charges applied to system, recorded. All activities analyzed in Pclamp software and transferred to Prism 6 and reported as appropriate graphs. **Results:** Harmaline exposure induced sever alterations in the spontaneous and evoked firing behavior of purkinje neurons in purkinje cells as evidenced by a significant decrease in the mean number of spikes, half width and instantaneous frequency. Also reduced AHP, action potential amplitude were seen. **Conclusion:** These results suggest that harmaline induced sever alterations in electrophysiological properties of purkinje neurons that may use to explain some behavioral effects of its toxicity like Tremor seen in dose dependent manner reported in some studies. We suggested that use of other member of this compound like Harman and also their effects in behavioral characteristics for confirmation.

Keywords: Harmaline toxicity, Cannabinoid receptor, Purkinje cell

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