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Effects of Tualang Honey Pre-Treatment on Cerebellar and Striatal Neuronal Changes and Excitatory Amino Acid Transporter-2 (EAAT2) Expression Following Kainic Acid Exposure in Rats
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Abstract
Excitatory amino acid transporter-2 (EAAT2) is the predominant glutamate transporter that helps in maintaining low extracellular glutamate levels in the brain. Defect in EAAT2 causes impaired clearance and accumulation of this excitatory neurotransmitter, leading to excitotoxicity and neuronal cell death. The cerebellum and striatum play an important role in motor functions. This study aimed to evaluate the effects of Tualang honey (TH) on cerebellar and striatal neuronal changes as well as EAAT2 expression following kainic acid (KA) exposure in rats. Male Sprague-Dawley rats (n=48) were divided into four groups depending on the respective treatment. Each group was further divided into two subgroups based on time-point of sacrifice at 24-hour or at 5-days after KA injection. The rats were initially treated orally with distilled water, TH (1.0 g/kg) or topiramate (40 mg/kg), 12-hourly for five times. Then, the rats were injected with saline or KA (15 mg/kg) 30 minutes after the fifth oral dose. Before the rats were sacrificed, an open field test was conducted. Locomotor activity significantly increased in all KA-injected groups 5 days after KA administration. TH pre-treatment significantly reduced cerebellar neuronal death 5 days after KA injection. TH pre-treatment also showed to reduce KA-induced loss of striatal neurons 24 hours after KA injection as well as increases EAAT2 expression in 24 hours and 5 days groups. These results imply that pre-treatment with TH may mitigate the KA-induced excitotoxicity in the cerebellum and striatum partly via modulation of EAAT2 expression.

Author Keywords
cerebellum; EAAT2 expression; kainic acid; striatum; Tualang honey

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