Comparison between the effects of quercetin on seizure threshold in acute and chronic seizure models

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Abstract

Flavonoids are important constituents of food and beverages, and several studies have shown that they have neuroactive properties. Many of these compounds are ligands for γ-aminobutyric acid type A receptors in the central nervous system. This study aimed to investigate the anticonvulsant effects of quercetin (3,3′,4′,5,7-pentahydroxyflavone), which is a flavonoid found in plants, in rats treated with pentylenetetrazole in acute and chronic seizure models. Single intraperitoneal administration of quercetin did not show anticonvulsive effects against acute seizure. Similarly, multiple oral pretreatment with quercetin did not have protective effects against acute seizure. However, multiple intraperitoneal administration of quercetin (25 and 50 mg/kg) significantly increased time to death compared with the control ($p < 0.001$). However, quercetin pretreatment had no significant effects on the pattern of convulsion development during all periods of kindling. But on the test day, quercetin (100 mg/kg) could significantly increase generalized tonic–clonic seizure onset (GTCS) and decrease GTCS duration compared with the control ($p < 0.01$, $p < 0.05$). We conclude that quercetin has a narrow therapeutic dose range for anticonvulsant activities *in vivo*, and it has different effects on the seizure threshold. The different effects of quercetin on seizure threshold may occur through several mechanisms.