

Hippocampal apoptosis

The [hippocampus](#) is susceptible to [damage](#) in [patients](#) with [epilepsy](#) and in [animals](#) with [seizures](#) caused by excitotoxic agents. The effect of vitamin D on [hippocampal apoptosis](#) related with [seizures](#) has not been reported. However, epileptic patients have an increased risk of [hypovitaminosis D](#) which is most likely due to the effects of [antiepileptic drugs](#). Therefore, in a study of Şahin et al., from [Trabzon](#), it was aimed to evaluate the effects of [vitamin D](#) on hippocampal apoptosis related with [seizures](#) by using [pentylentetrazol](#) (PTZ) and [kainic acid](#) (KA) in [rats](#).

Male [Sprague Dawley rats](#), aged 5.5 weeks, were randomly divided into six groups: control, vitamin D, PTZ, KA, PTZ + vitamin D and KA + vitamin D groups. The groups that received vitamin D were given 500 IU/kg of vitamin D daily for two weeks in addition to a standard diet. At the end of this period, PTZ and KA were applied to trigger seizures in the rats in the seizure groups. 24 h after the administration of PTZ and KA, the rats were decapitated. In the [hippocampal region](#), apoptosis was assessed by TUNEL and brain-derived neurotrophic factor (BDNF), Bax, caspase-3 and c-fos activation were evaluated by immunohistochemical method.

BDNF level increased while c-fos, Bax and caspase-3 levels decreased ($p < 0.0001$, in all) in the hippocampal neurons of the groups that were pre-treated with vitamin D before the administration of PTZ and KA, in comparison with the PTZ and KA groups. Vitamin D significantly decreased the number of apoptotic cells in these rats in comparison with the PTZ and KA groups ($p < 0.0001$).

This study indicates that vitamin D has [neuroprotective](#) effects on hippocampal apoptosis induced by PTZ and KA in rats. With this study it is suggested that keeping vitamin D levels within normal limits may be beneficial for patients with epilepsy, especially children ¹⁾.

¹⁾

Şahin S, Gürgen SG, Yazar U, İnce İ, Kamaşak T, Acar Arslan E, Diler Durgut B, Dilber B, Cansu A. Vitamin D protects against hippocampal apoptosis related with seizures induced by kainic acid and pentylentetrazol in rats. *Epilepsy Res.* 2018 Dec 15;149:107-116. doi: 10.1016/j.epilepsyres.2018.12.005. [Epub ahead of print] PubMed PMID: 30584976.

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Last update: **2024/06/07 02:50**

