

# Antinociceptive effects of gabapentin & its mechanism of action in experimental animal studies

By: **Kilic, FS** (Kilic, Fatma Sultan)<sup>[1]</sup>; **Sirmagul, B** (Sirmagul, Basar)<sup>[1]</sup>; **Yildirim, E** (Yildirim, Engin)<sup>[1]</sup>; **Oner, S** (Oner, Setenay)<sup>[2]</sup>; **Erol, K** (Erol, Kevser)<sup>[1]</sup>

[View Web of Science ResearcherID and ORCID](#)

INDIAN JOURNAL OF MEDICAL RESEARCH

Volume: 135

Issue: 5

Pages: 630-635

Published: MAY 2012

Document Type: Article

[View Journal Impact](#)

## Abstract

**Background & objectives:** Several studies have shown the possible analgesic effects of gabapentin, widely used as an antiepileptic. Thus, clinical studies have been carried out especially for neuropathic syndroms. This study was undertaken to investigate experimentally whether gabapentin has analgesic effects in mice and rats.

**Methods:** The mice were divided into 10 groups (n=7) with various treatments to assess central and peripheral antinociceptive activity of gabapentin. Hot plate, tail clip and tail flick tests were applied for the investigation of central antinociceptive activity and the writhing test was applied for the investigation of peripheral antinociceptive activity. In addition, we also evaluated the levels of PGE(2) and nNOS on perfused hippocampus slices of rats.

**Results:** Gabapentin showed a peripheral antinociceptive effect at all doses and a central antinociceptive effect at 30mg/kg dose. While the L-NAME and cyproheptadine changed the central and peripheral effects of gabapentin, naloxone did not change these effects. In vitro studies showed that gabapentin significantly increased nNOS level. PGE(2) and nNOS were found to have an important role in the antinociceptive effects of gabapentin at all doses and its combinations with L-NAME, cyproheptadine, indomethacine, and naloxone. As expected, PGE(2) levels decreased in all groups, while nNOS levels increased, which is believed to be an adaptation mechanism.

**Interpretation & conclusions:** Our findings indicate that arachidonate, nitrenergic and serotonergic systems play an important role in the antinociceptive activity of gabapentin except for the opioidergic system. Additionally, this effect occurred centrally and peripherally. These effects were also mediated by nNOS and PGE2.

## Keywords

**Author Keywords:** Antinociceptive effect; gabapentin; mice; nNOS; PGE(2); rat hippocampus slices

**KeyWords Plus:** NITRIC-OXIDE; RAT CEREBELLUM; RECEPTOR; ANTICONVULSANT; ACID

## Author Information

### Reprint Address:

*Eskisehir Osmangazi University Eskisehir Osmangazi Univ, Dept Pharmacol, Sch Med, TR-26480 Eskisehir, Turkey.*

**Corresponding Address:** Kilic, FS (corresponding author)

+ Eskisehir Osmangazi Univ, Dept Pharmacol, Sch Med, TR-26480 Eskisehir, Turkey.

### Addresses:

+ [ 1 ] Eskisehir Osmangazi Univ, Dept Pharmacol, Sch Med, TR-26480 Eskisehir, Turkey

+ [ 2 ] Eskisehir Osmangazi Univ, Dept Biostat, Sch Med, TR-26480 Eskisehir, Turkey

**E-mail Addresses:**[fskilic@ogu.edu.tr](mailto:fskilic@ogu.edu.tr)

## Funding

<b>Funding Agency</b> <a href="#">Show details</a>	<b>Grant Number</b>
Eskisehir Osmangazi University	

[View funding text](#)