

Format: Abstract

Send to

Front Pharmacol. 2017 Jun 21;8:391. doi: 10.3389/fphar.2017.00391. eCollection 2017.

# Cannabidiol Is a Potential Therapeutic for the Affective-Motivational Dimension of Incision Pain in Rats.

Genaro K<sup>1,2</sup>, Fabris D<sup>1,2</sup>, Arantes ALF<sup>1,2</sup>, Zuardi AW<sup>1,3</sup>, Crippa JAS<sup>1,3</sup>, Prado WA<sup>2,4</sup>.

## Author information

### Abstract

**Background:** Pain involves different brain regions and is critically determined by emotional processing. Among other areas, the rostral anterior cingulate cortex (rACC) is implicated in the processing of affective pain. Drugs that interfere with the endocannabinoid system are alternatives for the management of clinical pain. Cannabidiol (CBD), a phytocannabinoid found in *Cannabis sativa*, has been utilized in preclinical and clinical studies for the treatment of pain. Herein, we evaluate the effects of CBD, injected either systemically or locally into the rACC, on mechanical allodynia in a postoperative pain model and on the negative reinforcement produced by relief of spontaneous incision pain. Additionally, we explored whether CBD underlies the reward of pain relief after systemic or rACC injection. **Methods and Results:** Male Wistar rats were submitted to a model of incision pain. All rats had mechanical allodynia, which was less intense after intraperitoneal CBD (3 and 10 mg/kg). Conditioned place preference (CPP) paradigm was used to assess negative reinforcement. Intraperitoneal CBD (1 and 3 mg/kg) inverted the CPP produced by peripheral nerve block even at doses that do not change mechanical allodynia. CBD (10 to 40 nmol/0.25  $\mu$ L) injected into the rACC reduced mechanical allodynia in a dose-dependent manner. CBD (5 nmol/0.25  $\mu$ L) did not change mechanical allodynia, but reduced peripheral nerve block-induced CPP, and the higher doses inverted the CPP. Additionally, CBD injected systemically or into the rACC at doses that did not change the incision pain evoked by mechanical stimulation significantly produced CPP by itself. Therefore, a non-rewarding dose of CBD in sham-incised rats becomes rewarding in incised rats, presumably because of pain relief or reduction of pain aversiveness. **Conclusion:** The study provides evidence that CBD influences different dimensions of the response of rats to a surgical incision, and the results establish the rACC as a brain area from which CBD evokes antinociceptive effects in a manner similar to the systemic administration of CBD. In addition, the study gives further support to the notion that the sensorial and affective dimensions of pain may be differentially modulated by CBD.

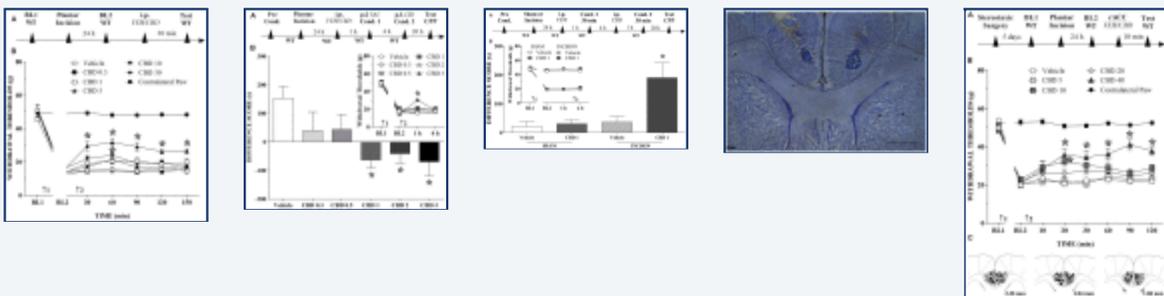
**KEYWORDS:** allodynia; anterior cingulate cortex; aversion; cannabidiol; endocannabinoids; pain

PMID: 28680401 PMCID: [PMC5478794](#) DOI: [10.3389/fphar.2017.00391](#)

### Free PMC Article



### Images from this publication. See all images (7) Free text



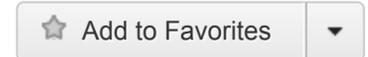
### LinkOut - more resources



### Full text links



### Save items



### Similar articles

Capturing the aversive state of cephalic pain preclinically. [Ann Neurol. 2013]

Lesion of the rostral anterior cingulate cortex eliminates the aversiv [Pain. 2011]

Endogenous opioid activity in the anterior cingulate cort [J Neurosci. 2015]

Antidepressant-like effect of cannabidiol injection into the [Behav Brain Res. 2016]

**Review** Cannabidiol, a Cannabis sativa constituent, [Braz J Med Biol Res. 2006]

See reviews...

See all...

### Related information

Articles frequently viewed together

MedGen

References for this PMC Article

Free in PMC

### Recent Activity

Turn Off Clear

Cannabidiol Is a Potential Therapeutic for the Affective- PubMed

Cannabinoids in the management of difficult to treat pain. PubMed

Role of the cannabinoid system in pain control and therapeutic PubMed

Role[Title] AND cannabinoid[Title] AND system[Title] AND pain[ PubMed

Cannabinoids suppress inflammatory and neuropathic PubMed

See more...

#### GETTING STARTED

- NCBI Education
- NCBI Help Manual
- NCBI Handbook
- Training & Tutorials
- Submit Data

#### RESOURCES

- Chemicals & Bioassays
- Data & Software
- DNA & RNA
- Domains & Structures
- Genes & Expression
- Genetics & Medicine
- Genomes & Maps
- Homology
- Literature
- Proteins
- Sequence Analysis
- Taxonomy
- Variation

#### POPULAR

- PubMed
- Bookshelf
- PubMed Central
- BLAST
- Nucleotide
- Genome
- SNP
- Gene
- Protein
- PubChem

#### FEATURED

- Genetic Testing Registry
- GenBank
- Reference Sequences
- Gene Expression Omnibus
- Genome Data Viewer
- Human Genome
- Mouse Genome
- Influenza Virus
- Primer-BLAST
- Sequence Read Archive

#### NCBI INFORMATION

- About NCBI
- Research at NCBI
- NCBI News & Blog
- NCBI FTP Site
- NCBI on Facebook
- NCBI on Twitter
- NCBI on YouTube
- Privacy Policy