

Format: Abstract

Send to

Br J Pharmacol. 2014 Feb;171(3):636-45. doi: 10.1111/bph.12439.

Cannabidiol inhibits paclitaxel-induced neuropathic pain through 5-HT(1A) receptors without diminishing nervous system function or chemotherapy efficacy.

Ward SJ¹, McAllister SD, Kawamura R, Murase R, Neelakantan H, Walker EA.

Author information

Abstract

BACKGROUND AND PURPOSE: Paclitaxel (PAC) is associated with chemotherapy-induced neuropathic pain (CIPN) that can lead to the cessation of treatment in cancer patients even in the absence of alternate therapies. We previously reported that chronic administration of the non-psychoactive cannabinoid cannabidiol (CBD) prevents PAC-induced mechanical and thermal sensitivity in mice. Hence, we sought to determine receptor mechanisms by which CBD inhibits CIPN and whether CBD negatively effects nervous system function or chemotherapy efficacy.

EXPERIMENTAL APPROACH: The ability of acute CBD pretreatment to prevent PAC-induced mechanical sensitivity was assessed, as was the effect of CBD on place conditioning and on an operant-conditioned learning and memory task. The potential interaction of CBD and PAC on breast cancer cell viability was determined using the MTT assay.

KEY RESULTS: PAC-induced mechanical sensitivity was prevented by administration of CBD (2.5 - 10 mg·kg⁻¹) in female C57Bl/6 mice. This effect was reversed by co-administration of the 5-HT(1A) antagonist WAY 100635, but not the CB₁ antagonist SR141716 or the CB₂ antagonist SR144528. CBD produced no conditioned rewarding effects and did not affect conditioned learning and memory. Also, CBD + PAC combinations produce additive to synergistic inhibition of breast cancer cell viability.

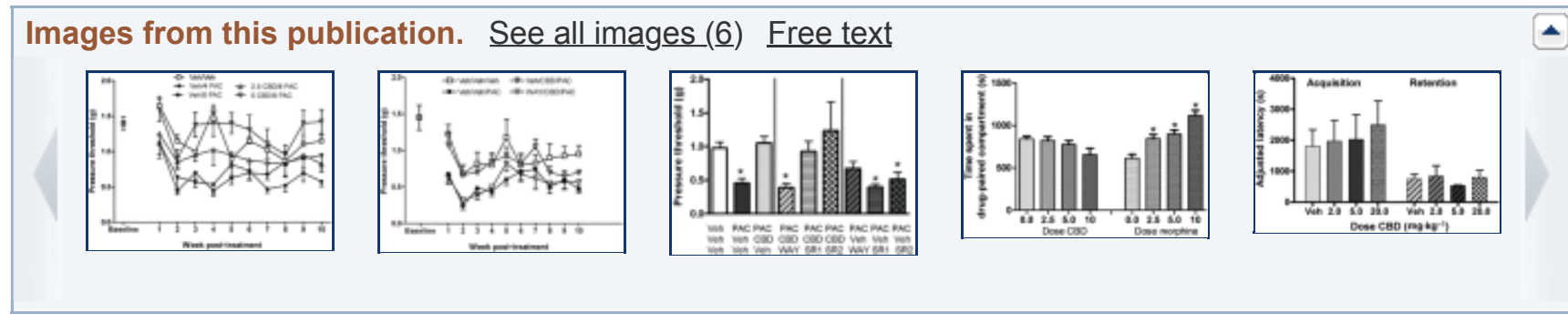
CONCLUSIONS AND IMPLICATIONS: Our data suggest that CBD is protective against PAC-induced neurotoxicity mediated in part by the 5-HT(1A) receptor system. Furthermore, CBD treatment was devoid of conditioned rewarding effects or cognitive impairment and did not attenuate PAC-induced inhibition of breast cancer cell viability. Hence, adjunct treatment with CBD during PAC chemotherapy may be safe and effective in the prevention or attenuation of CIPN.

© 2013 The British Pharmacological Society.

KEYWORDS: 5-HT1A; CIPN; breast cancer; cannabidiol; cannabinoid; chemotherapy-induced neuropathic pain; mechanical sensitivity; paclitaxel

PMID: 24117398 PMCID: PMC3969077 DOI: 10.1111/bph.12439

[Indexed for MEDLINE] [Free PMC Article](#)



MeSH terms, Substances +

LinkOut - more resources +

Full text links



Save items

★ Add to Favorites

Similar articles

- Mechanisms of cannabidiol neuroprotect [Neuropharmacology. 2013]
- Cannabidiol, a non-psychotropic component of car [Br J Pharmacol. 2012]
- Cannabidiol attenuates catalepsy indi [Prog Neuropsychopharmacol Biol...]
- Review** Extending therapeutic use of psy [Prog Neuropsychopharmacol Biol...]
- Review** Cannabidiol--recent advances. [Chem Biodivers. 2007]

See reviews...
See all...

Cited by 22 PubMed Central articles

- Review** Cannabinoids and Pain: New Insights From O [Front Pharmacol. 2018]
- Up-regulation of heme oxygenase-1 expression and inhibi [Oncotarget. 2018]
- Review** Understanding the endocannabinoid sys [Concussion. 2017]

See all...

Related information

Recent Activity

- [Cannabidiol inhibits paclitaxel-induced neuropathic pain thrc](#) PubMed
- [Vanilloid TRPV1 receptor mediates the antihyperalgesic effect of](#) PubMed
- [The non-psychoactive cannabis constituent cannabidiol is an](#) PubMed
- [Neuropathic orofacial pain: cannabinoids as a therapeutic](#) PubMed
- [Cannabinoids for neuropathic pain.](#) PubMed

See more...

You are here: NCBI > Literature > PubMed

Support Center

<p>GETTING STARTED</p> <ul style="list-style-type: none"> NCBI Education NCBI Help Manual NCBI Handbook Training & Tutorials Submit Data 	<p>RESOURCES</p> <ul style="list-style-type: none"> Chemicals & Bioassays Data & Software DNA & RNA Domains & Structures Genes & Expression Genetics & Medicine Genomes & Maps Homology Literature Proteins Sequence Analysis Taxonomy Variation 	<p>POPULAR</p> <ul style="list-style-type: none"> PubMed Bookshelf PubMed Central BLAST Nucleotide Genome SNP Gene Protein PubChem 	<p>FEATURED</p> <ul style="list-style-type: none"> Genetic Testing Registry GenBank Reference Sequences Gene Expression Omnibus Genome Data Viewer Human Genome Mouse Genome Influenza Virus Primer-BLAST Sequence Read Archive 	<p>NCBI INFORMATION</p> <ul style="list-style-type: none"> About NCBI Research at NCBI NCBI News & Blog NCBI FTP Site NCBI on Facebook NCBI on Twitter NCBI on YouTube Privacy Policy
--	--	---	--	--

