Neuropharmacology. 2017 Oct;125:220-230. doi: 10.1016/j.neuropharm.2017.07.024. Epub 2017 Jul 25.

# Cannabidiol disrupts the consolidation of specific and generalized fear memories via dorsal hippocampus $CB_1$ and $CB_2$ receptors.

Stern CAJ[1], da Silva TR[2], Raymundi AM[2], de Souza CP[2], Hiroaki-Sato VA[2], Kato L[2], Guimarães FS[3], Andreatini R[2], Takahashi RN[4], Bertoglio LJ[4].

Author information

## Abstract

Pharmacological interventions able to modulate a fear memory while it is consolidated could have therapeutic value in tempering those maladaptively overconsolidated. Animal and human studies have shown the intensity of unconditioned stimulus delivered during fear conditioning influences qualitative and quantitative aspects of the memory to be established. By varying the shock intensity used for contextual pairing in rats, here we induced specific and more generalized long-term fear memories to investigate whether, how and where in the brain the cannabidiol (CBD; 3.0-30 mg/kg i.p.) could impair their consolidation and related outcomes. When given immediately after their acquisition, it reduced respectively the conditioned fear expression, and fear generalization, ultrasonic vocalizations at 22-kHz and the relative resistance to extinction. CBD had no effects on short-term fear memory, and its delayed treatment no longer affected the consolidation process. As the dorsal hippocampus (DH) modulates fear memory specificity and generalization, and cannabinoid type-1 ($CB_1$) and type-2 ($CB_2$) receptors contribute to consolidation, we investigated their involvement in CBD effects. Both systemic and intra-DH treatment with the $CB_1$ receptor antagonist/inverse agonist AM251 or the $CB_2$ receptor antagonist/inverse agonist AM630 prevented the disrupting CBD effects on consolidation. Since the CBD effects on the endocannabinoid transmission are probably indirect, we investigated and demonstrated the FAAH inhibitor URB597 induced effects similar to those of CBD when given systemically or intra-DH. Altogether, the present results suggest the CBD disrupts the consolidation of different fear memories via anandamide-mediated activation of DH $CB_1$ and $CB_2$ receptors.



**KEYWORDS:** Cannabidiol; Consolidation; Extinction; Generalization; Hippocampus

PMID: 28754373 DOI: 10.1016/j.neuropharm.2017.07.024

[Indexed for MEDLINE]

MeSH terms, Substances

LinkOut - more resources

Full text links
ELSEVIER FULL-TEXT ARTICLE

Save items
Add to Favorites

Similar articles
Effects of endocannabinoid and endovanilloid sy [Behav Brain Res. 2013]
Increased Contextual Fear Conditioning in iN [Int J Neuropsychopharmacol. 2015]
Antinociceptive effects of HUF-101, a fluc [Prog Neuropsychopharmacol Biol...]
Review Are cannabidiol and Δ(9) - tetrahydrocannat [Br J Pharmacol. 2015]
Review Multiple mechanisms involved in the [Philos Trans R Soc Lond B Biol...]
See reviews...
See all...

Cited by 2 PubMed Central articles
Pharmacological Comparisons Between Cannabidiol and ł [J Mol Neurosci. 2018]
Review Cannabidiol as a Promising Strategy to Trea [Front Pharmacol. 2018]

Related information
Articles frequently viewed together
MedGen
PubChem Compound (MeSH Keyword)
Cited in PMC

Recent Activity
Turn Off Clear
Cannabidiol disrupts the consolidation of specific and PubMed
See more...

You are here: NCBI > Literature > PubMed
Support Center

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

National Center for Biotechnology Information, U.S. National Library of Medicine
8600 Rockville Pike, Bethesda MD, 20894 USA
**Policies and Guidelines** | **Contact**