CÂMARA DOS DEPUTADOS
COMISSÃO ESPECIAL - PL 0399/15 - MEDICAMENTOS
FORMULADOS COM CANNABIS

Indicações terapêuticas dos canabinóides
&
Diferenças entre canabinóides naturais e sintéticos

Sidarta Ribeiro, Ph.D.

INSTITUTO DO CÉREBRO

UFRN UNIVERSIDADE FEDERAL DO RIO GRANDE DO NORTE

PLATAFORMA BRASILEIRA DE POLÍTICA DE DROGAS

70 SBPC Sociedade Brasileira para o Progresso da Ciência


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Review

Cell PRESS

Non-psychotropic plant cannabinoids: new therapeutic opportunities from an ancient herb

Angelo A. Izzo[1,4], Francesca Borrelli[1,4], Raffaele Capasso[1,4], Vincenzo Di Marzo[2,4] and Raphael Mechoulam[3]

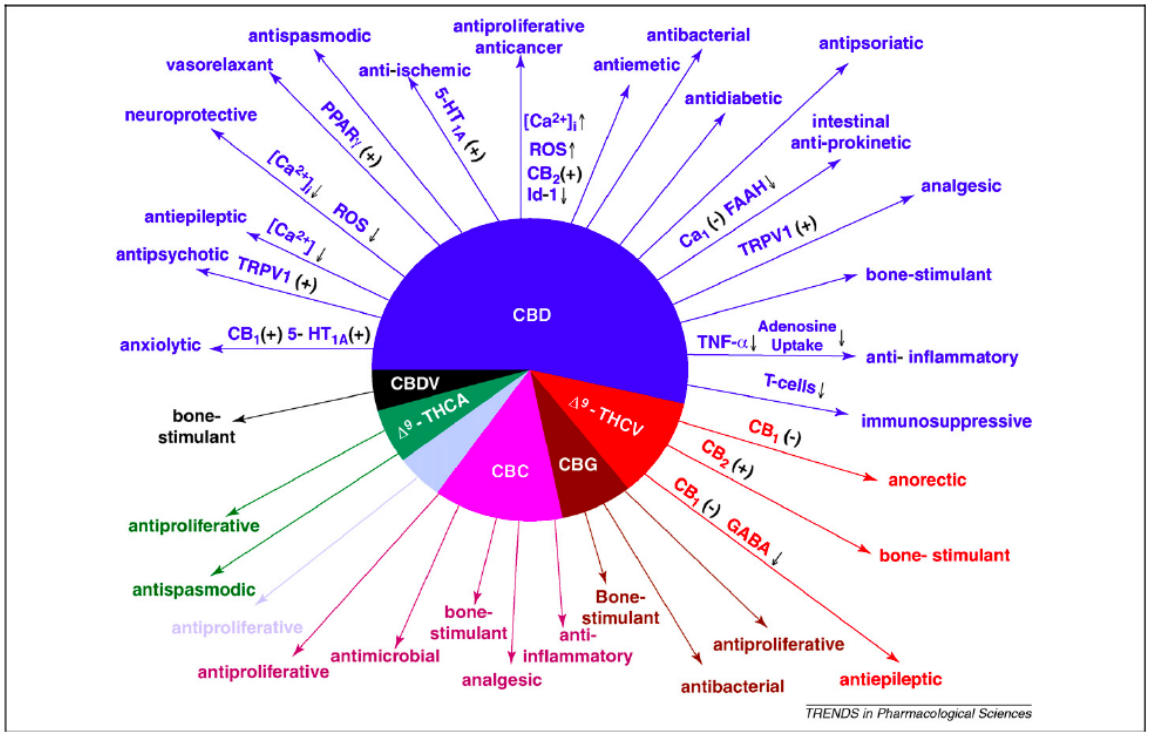

Figure 1. Pharmacological actions of non-psychotropic cannabinoids (with the indication of the proposed mechanisms of action).
Abbreviations: Δ^9-THC, Δ^9-tetrahydrocannabinol; Δ^8-THC, Δ^8-tetrahydrocannabinol; CBN, cannabinol; CBD, cannabidiol; Δ^9-THCV, Δ^9-tetrahydrocannabivarin; CBC, cannabichromene; CBG, cannabigerol; Δ^9-THCA, Δ^9-tetrahydrocannabinolic acid; CBDA, cannabidiolic acid; TRPV1, transient receptor potential vanilloid type 1; PPARγ, peroxisome proliferator-activated receptor γ; ROS, reactive oxygen species; 5-HT_{1A}, 5-hydroxytryptamine receptor subtype 1A; FAAH, fatty acid amide hydrolase.
(+), direct or indirect activation; ↑, increase; ↓, decrease.

Review

Cell PRESS

Non-psychotropic plant cannabinoids: new therapeutic opportunities from an ancient herb

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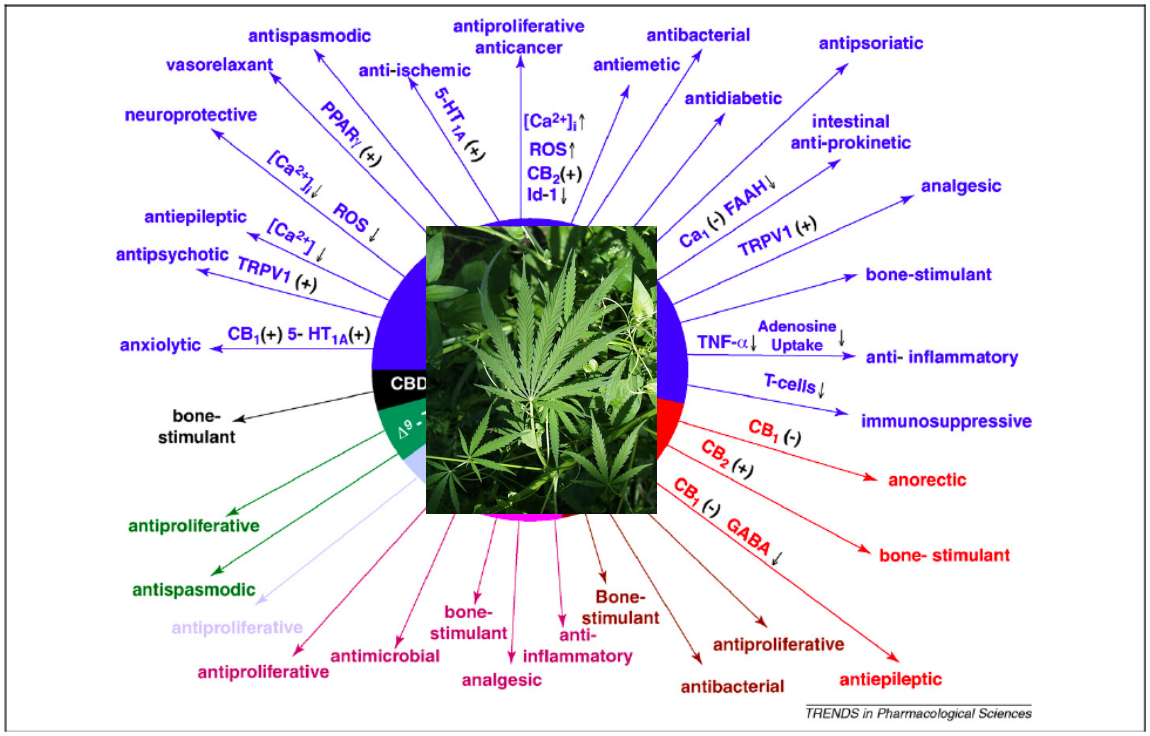

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Why I changed my mind on weed

By **Dr. Sanjay Gupta**, CNN Chief Medical Correspondent

August 9, 2013 -- Updated 0044 GMT (0844 HKT)

Part of complete covera
The Marijuan

Será a Cannabis um Santo Graal para a medicina?

Epilepsia

Envelhecimento

Câncer

Epilepsia

PROVINCIAL MEDICAL JOURNAL

And Retrospect of the Medical Sciences.

No. 123.] LONDON, SATURDAY, FEBRUARY 4, 1843. [PRICE SIXPENCE. Stamped Edition Sevenpence.

ON THE PREPARATIONS OF THE INDIAN HEMP, OR GUNJAH,* (*Cannabis Indica*)

Their Effects on the Animal System in Health, and their Utility in the Treatment of Tetanus and other Convulsive Diseases.

By W. B. O'Shaughnessy, M.D., Bengal Army,
Late Professor of Chemistry and Materia Medica in the Medical College of Calcutta.

[Concluded from p. 347.]

Experiments by the Author—Inferences as to the Action of the Drug on Animals and Man.

Such was the amount of preliminary information before me, by which I was guided in my subsequent attempts to gain more accurate knowledge of the action, powers, and possible medicinal applications of this extraordinary agent.

There was sufficient to show that hemp possesses, in small doses, an extraordinary power of stimulating the digestive organs, exciting the cerebral system, of acting also on the generative apparatus. Larger doses, again, were shown by the historical statements to induce insensibility or to act as a powerful sedative. The influence of the drug in allaying pain was equally manifest in all the memoirs referred to. As twenty minutes was ridiculously drunk; in four hours his symptoms passed away, also without harm.

Expts. 3, 4, and 5.—Three kids had ten grains each of the alcoholic extract of *gunjah*. In one no effect was produced; in the second there was much heaviness, and some inability to move; in the third a marked alteration of countenance was conspicuous, but no further effect.

Expt. 6.—Twenty grains were given, dissolved in a little spirit, to a dog of very small size. In a quarter of an hour he was intoxicated; in half an hour he had great difficulty of movement; in an hour he had lost all power over the hinder extremities, which were rather stiff but flexible; sensibility did not seem to be impaired, and the circulation was natural. He readily acknowledged calls by an attempt to rise up. In four hours he was quite well.

In none of these or several other experiments was there the least indication of pain, or any degree of convulsive movement observed.

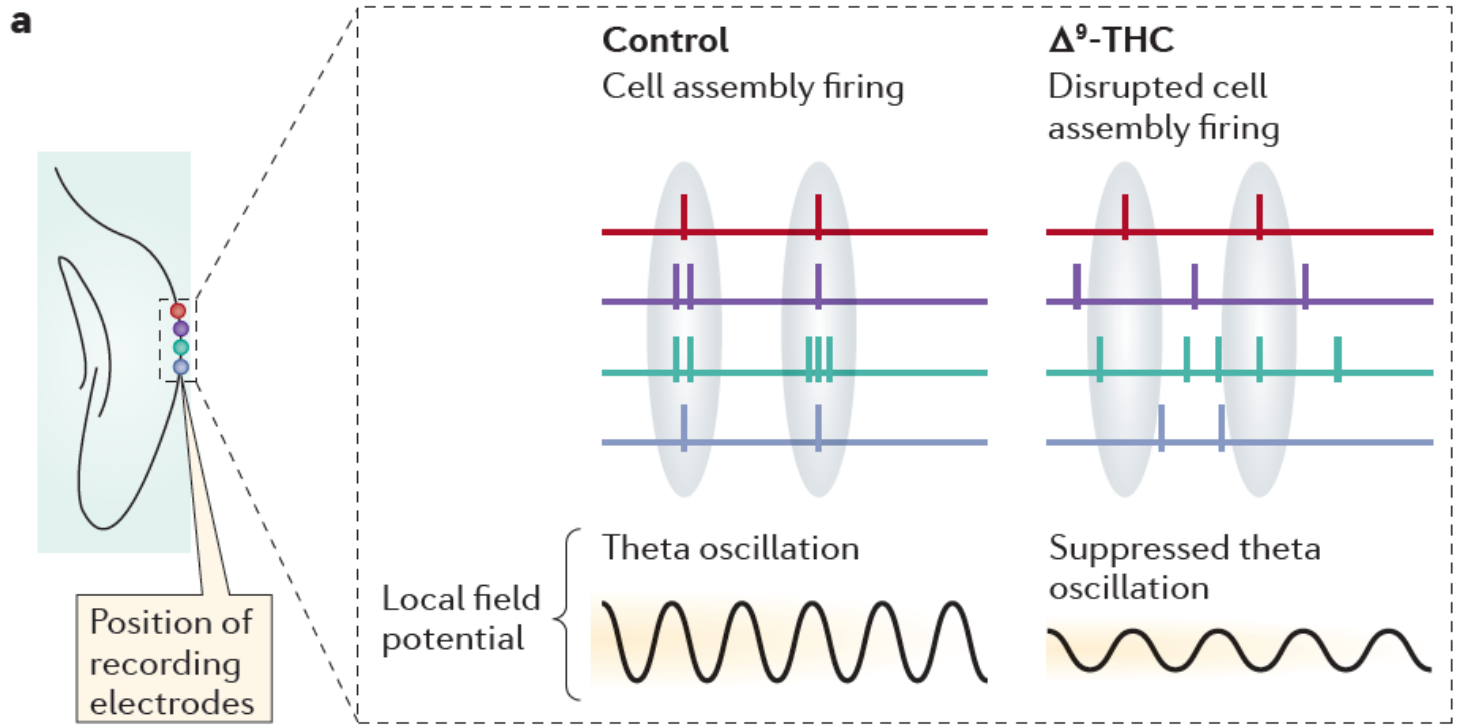
It seems needless to dwell on the details of each experiment; suffice it to say that they led to one remarkable result—that while carnivorous animals and fish, dogs, cats, swine, vultures, crows, and adjutants, invariably exhibited the intoxicating influence of the drug, the graminivorous, such as the horse, deer, monkey, goat, sheep, and cow, experienced but

nature neuroscience

Cannabinoids reveal importance of spike timing coordination in hippocampal function

David Robbe[1], Sean M Montgomery[1], Alexander Thome[2], Pavel E Rueda-Orozco[1], Bruce L McNaughton[2] & György Buzsaki[1]

1526 VOLUME 9 | NUMBER 12 | DECEMBER 2006 NATURE NEUROSCIENCE



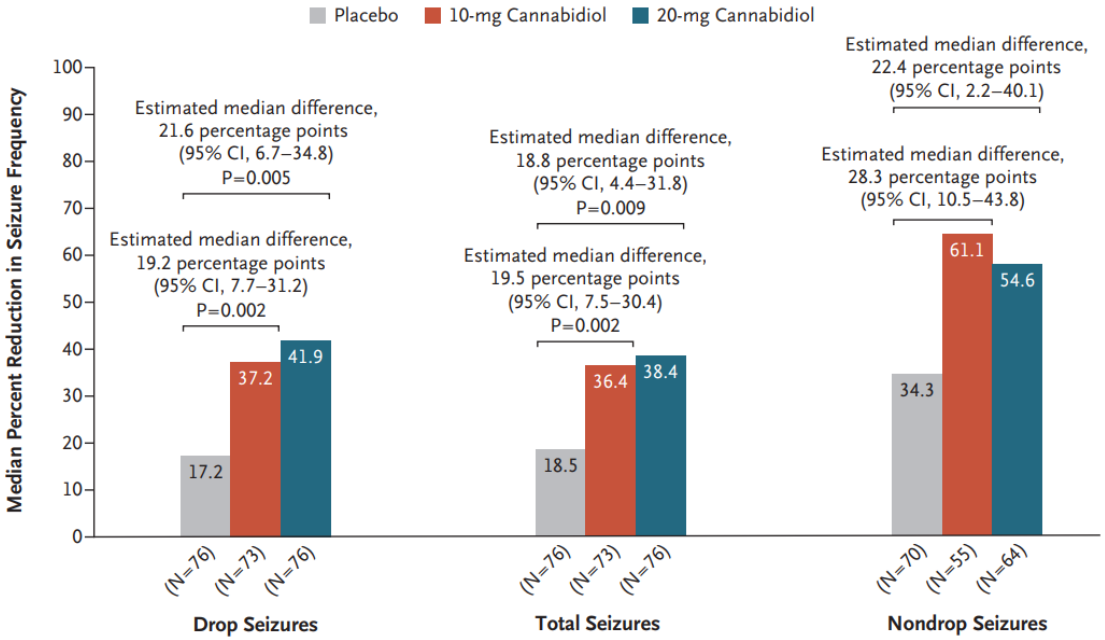
Ensaios clínicos com CBD

Table 2. Primary Efficacy End Point of Percentage Change in Convulsive-Seizure Frequency in Each Trial Group.*

Variable	Cannabidiol	Placebo	Adjusted Median Difference (95% CI)	P Value†
			percentage points	
No. of convulsive seizures per mo — median (range)				
Baseline	12.4 (3.9 to 1717)	14.9 (3.7 to 718)		
Treatment period	5.9 (0.0 to 2159)	14.1 (0.9 to 709)		
Percentage change in seizure frequency — median (range)	−38.9 (−100 to 337)	−13.3 (−91.5 to 230)	−22.8 (−41.1 to −5.4)	0.01

* CI denotes confidence interval.
† The P value was calculated with the use of a Wilcoxon rank-sum test with the Hodges–Lehmann approach.

Devinsky et al., The New England Journal, 2017



Devinsky et al., The New England Journal, 2018

ANNALS of Clinical and Translational Neurology
Open Access
ANA American Neurological Association

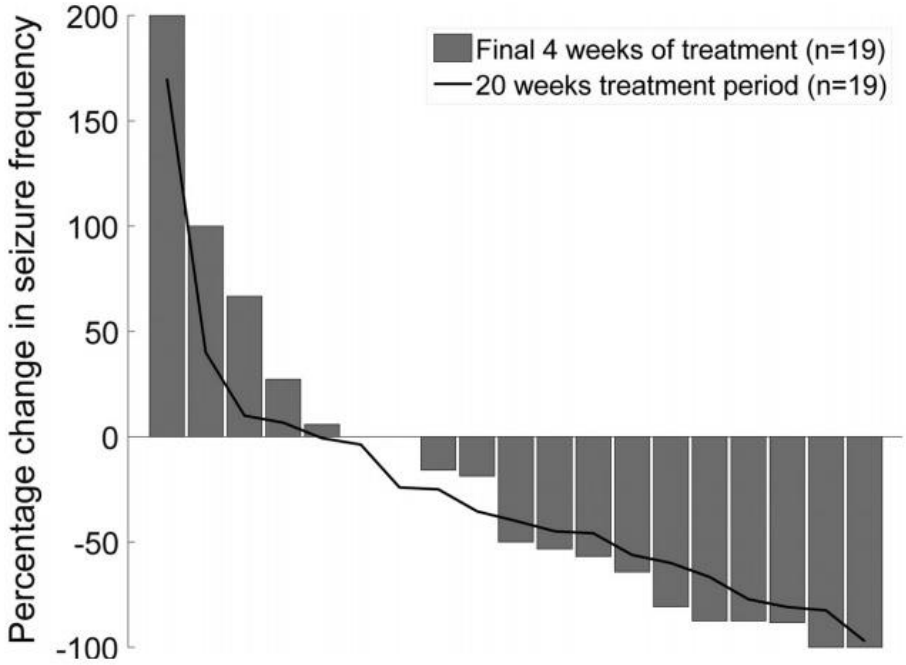
RESEARCH ARTICLE

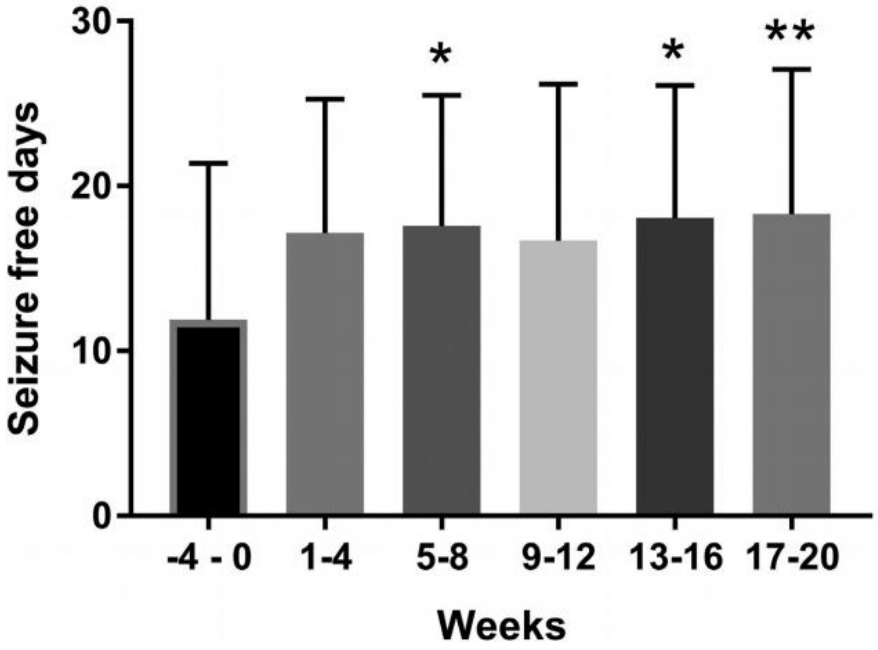
A prospective open-label trial of a CBD/THC cannabis oil in dravet syndrome

Bláthnaid McCoy[1,2], Laura Wang[3], Maria Zak[1], Sameer Al-Mehmadi[1], Nadia Kabir[1], Kenda Alhadid[1], Kyla McDonald[4], Grace Zhang[4], Rohit Sharma[1], Robyn Whitney[1,2], Katia Sinopoli[4] & O. Carter Snead III[1]

[1]Division of Neurology, the Hospital for Sick Children, Toronto, Canada
[2]Department of Pediatrics, University of Toronto, Toronto, Canada
[3]Department of Pharmacy, Hospital for Sick Children, Toronto, Canada
[4]Department of Psychology, the Hospital for Sick Children, Toronto, Ontario, Canada

Ensaio clínico com óleo de Cannabis





ANNUAL MEETING ABSTRACTS: VIEW

« Back to Search Results

(Abst. 2.233), 2018

CANNABIDIOL TOLERANCE IN CHILDREN AND ADULTS WITH TREATMENT-RESISTANT EPILEPSY

Authors: Shimrit Uliel-Sibony, Tel-Aviv Sourasky Medical Center, Dana Children's Hospital; Moran Hausman-Kedem, Tel-Aviv Sourasky Medical Center, Dana Children's Hospital; and Uri Kramer, Tel-Aviv Sourasky Medical Center, Dana Children's Hospital

Content:

RATIONALE:
The aim of this study is to assess the tolerance rate of cannabinoids in the treatment of epilepsy in the pediatric and adults population.

METHODS:
Prospective review of the tolerance to cannabinoids of 92 consecutive patients aged 1-37 years (mean11.8 years) with treatment-resistant epilepsy during the period of 1.3.2014 to 31.9.2017. Tolerance was defined as either the necessity to increase dose in 30% or more following reduction of efficacy, or response reduction of more than 30%.

RESULTS:
Ninety-two patients with treatment-resistant epilepsy of various etiologies were treated with cannabis oil extract (CBD/THC ratio of 20:1) for an average of 19.8 months. Tolerance was seen in 30 (32.6%) of the patients. It was reported on an average dose of 12.6 mg/kg/d and the mean time till appearance of tolerance was 7.3 months (range: 1-24 months). Out of these patients 58% (17 patients) showed > 50% reduction in mean monthly seizure frequency. While trying to resist the tolerance effect, CBD dose was increased in most patients with observed tolerance. This led to achieving pervious response level in 12 and satisfying but less than prior response level in 15 patients. Of the patients with observed tolerance, in nine it was concomitant with drug's tapering.

CONCLUSIONS:
Our findings suggest that cannabidiol tolerance exists and it limits the efficacy of this antiseizure treatment in the long-term clinical management of epilepsy in the pediatric and adults population

FUNDING:
No funding was received.

CBD puro deixa de funcionar depois de 7 meses (tolerância)

Envelhecimento

frontiers in Pharmacology

MINI REVIEW
published: 03 February 2017
doi: 10.3389/fphar.2017.00020

In vivo Evidence for Therapeutic Properties of Cannabidiol (CBD) for Alzheimer's Disease

Georgia Watt[1] *and Tim Karl*[1,2]*

[1] *Karl Group, Behavioural Neuroscience, Western Sydney Research Australia, Randwick, NSW, Australia*

TABLE 1 | Summary of the effects of CBD and CBD-THC combinations on AD models.

	Effect of Cannabidiol on AD-like Pathology	
Model	**Effect**	**References**
***IN VITRO* STUDIES USING CBD**		
PC12 Neuronal Cells	Protected against Aβ neurotoxicity and oxidative stress, increased cell survival and decreased ROS production and lipid peroxidation	Iuvone et al., 2004
	Inhibited tau hyperphosphorylation	Esposito et al., 2006a
	Prevented transcription of pro-inflammatory genes	Esposito et al., 2006b
Glutamate Neuronal Toxicity Model	Antioxidant properties	Hampson et al., 1998
Primary Rat Microglia	Increased microglial migration and prevented ATP-induced intracellular calcium increase	Martín-Moreno et al., 2011
PC12 and SH-SY5Y Cells	Improved cell viability after treatment with *tert*-butyl hydroperoxide treatment	Harvey et al., 2012
SH-SY5Y Cells	Protected against Aβ neurotoxicity and microglial-activated neurotoxicity	Janefjord et al., 2014
SH-SY5Y^{APP+} Cells	Induced APP ubiquination and subsequently Aβ production and increased cell survival by reducing apoptotic rate	Scuderi et al., 2014
***IN VIVO* STUDIES USING CBD**		
Mice inoculated with human $A\beta_{42}$ peptide	Attenuated Aβ induced neuroinflammatory responses by decreasing expression of pro-inflammatory gene and mediators	Esposito et al., 2007
	Reduced reactive gliosis	Esposito et al., 2011
Mice intraventricularly injected with fibrillar Aβ	Decreased microglial activation and reversed a spatial reference memory deficit in the MWM	Martín-Moreno et al., 2011
APPxPS1 transgenic mice (mixed background)	Reversed social and object recognition memory deficits in the CB task	Cheng et al., 2014a
	Prevented development of social recognition memory deficits. No effect on Aβ load but subtle effects on inflammatory markers, cholesterol and dietary phytosterol retention	Cheng et al., 2014b
***IN VIVO* STUDIES USING CBD-THC**		
Young *APPxPS1* transgenic mice (mixed background)	Improved memory deficits in the two-object recognition task and the active avoidance task. Decreased soluble $A\beta_{42}$ levels and changed plaque composition and reduced astrogliosis, microgliosis and inflammatory related molecules	Aso et al., 2015
Aged *APPxPS1* transgenic mice (mixed background)	Restored cognition in the two object recognition task but had no effects on Aβ load or related glial reactivity	Aso et al., 2016
Transgenic tauopathy mouse model	Reduced Aβ and tau deposition in the hippocampus and cerebral cortex, increased autophagy, decreased gliosis, increased the ratio of reduced/oxidized glutathione and reduced levels of iNOS	Casarejos et al., 2013

A chronic low dose of Δ^9-tetrahydrocannabinol (THC) restores cognitive function in old mice

Andras Bilkei-Gorzo[1,4], Onder Albayram[1,4], Astrid Draffehn[2], Kerstin Michel[1], Anastasia Piyanova[1], Hannah Oppenheimer[3], Mona Dvir-Ginzberg[3], Ildiko Rácz[1], Thomas Ulas[2], Sophie Imbeault[1], Itai Bab[3], Joachim L Schultze[2] & Andreas Zimmer[1]

[1]Institute of Molecular Psychiatry, University of Bonn, Bonn, Germany. [2]Genomics and Immunoregulation, LIMES Institute, Bonn, Germany. [3]Institute of Dental Sciences, Hebrew University, Jerusalem, Israel. [4]These authors contributed equally to this work. Correspondence should be addressed to A.Z. (neuro@uni-bonn.de).

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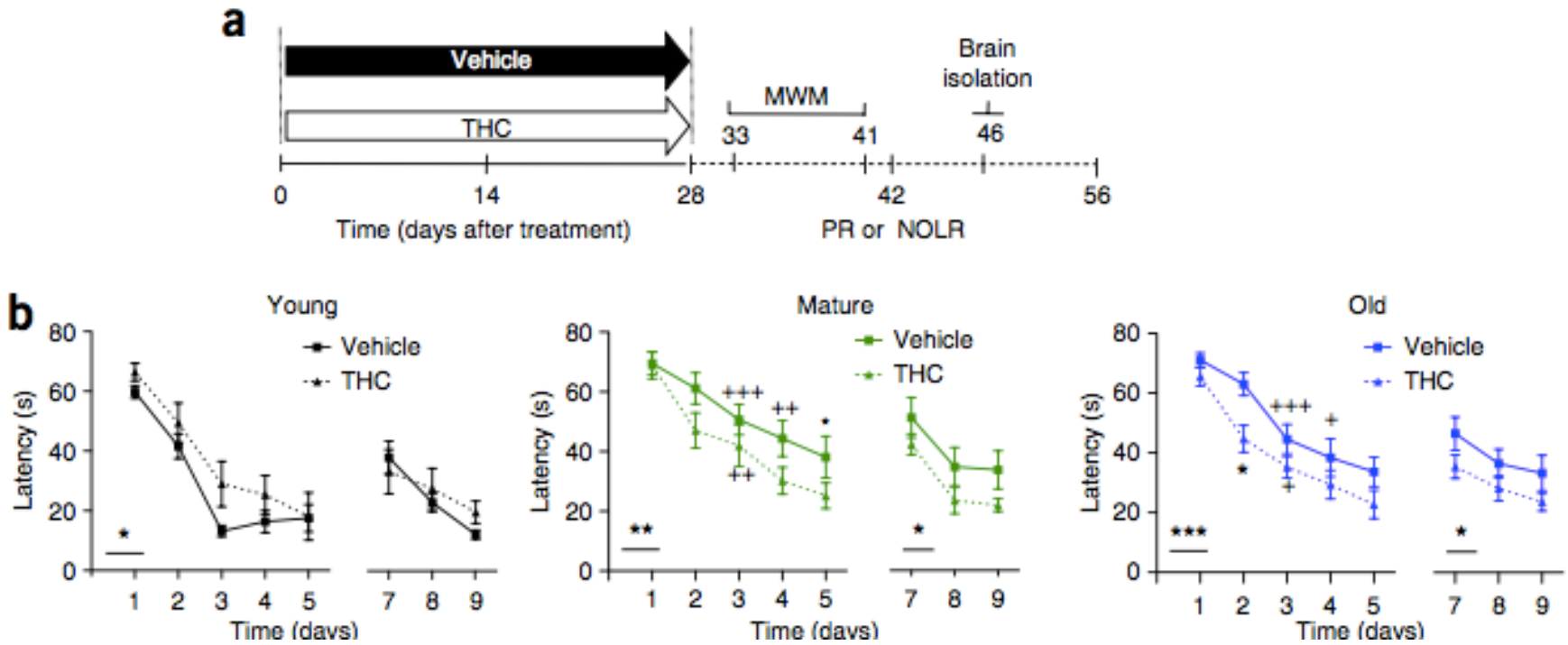
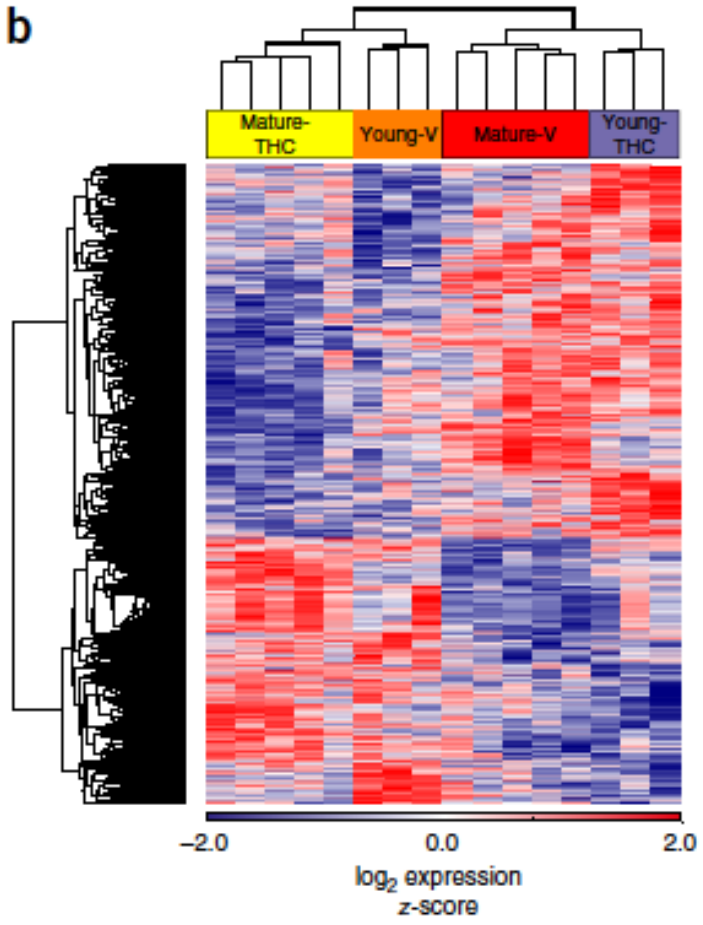
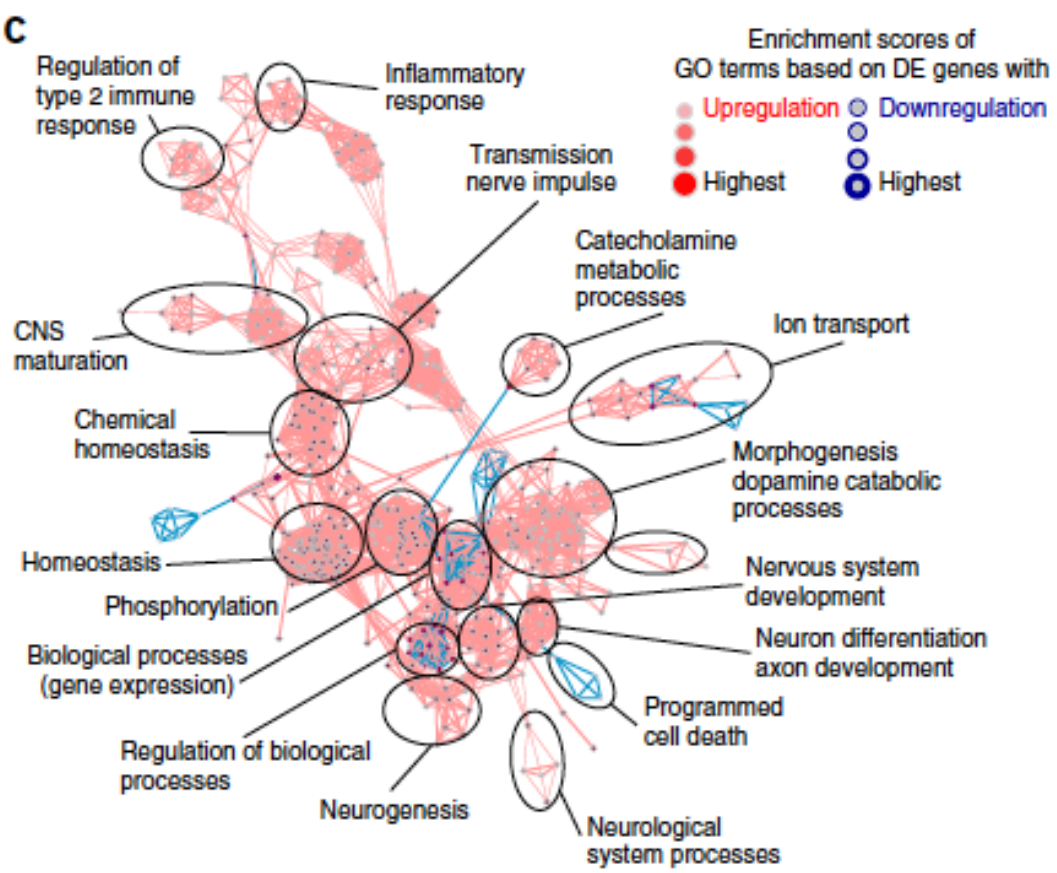



b
Mature-THC
Young-V
Mature-V
Young-THC
–2.0
0.0
2.0
log2 expression z-score


c
Enrichment scores of GO terms based on DE genes with
Upregulation
Downregulation
Highest
Highest
Regulation of type 2 immune response
Inflammatory response
Transmission nerve impulse
Catecholamine metabolic processes
Ion transport
CNS maturation
Chemical homeostasis
Morphogenesis dopamine catabolic processes
Homeostasis
Nervous system development
Phosphorylation
Neuron differentiation axon development
Biological processes (gene expression)
Programmed cell death
Regulation of biological processes
Neurogenesis
Neurological system processes

Câncer

frontiers in Pharmacology

REVIEW
published: 07 October 2016
doi: 10.3389/fphar.2016.00361

Preclinical and Clinical Assessment of Cannabinoids as Anti-Cancer Agents

Daniel A. Ladin[1], *Eman Soliman*[1,2], *LaToya Griffin*[1] *and Rukiyah Van Dross*[1,3]*

[1] *Department of Pharmacology and Toxicology, Brody School of Medicine, East Carolina University, Greenville, NC, USA,* [2] *Department of Pharmacology and Toxicology, Faculty of Pharmacy, Zagazig University, Zagazig, Egypt,* [3] *Center for Health Disparities, East Carolina University, Greenville, NC, USA*

Tipo de câncer	Publicações
Glioma	18
Seio	11
Pulmão	9
Intestino	7
Fígado	5
Melanoma	3
Próstata	2
Tiróide	2
Câncer de pele (não-melanoma)	2
Pâncreas	1

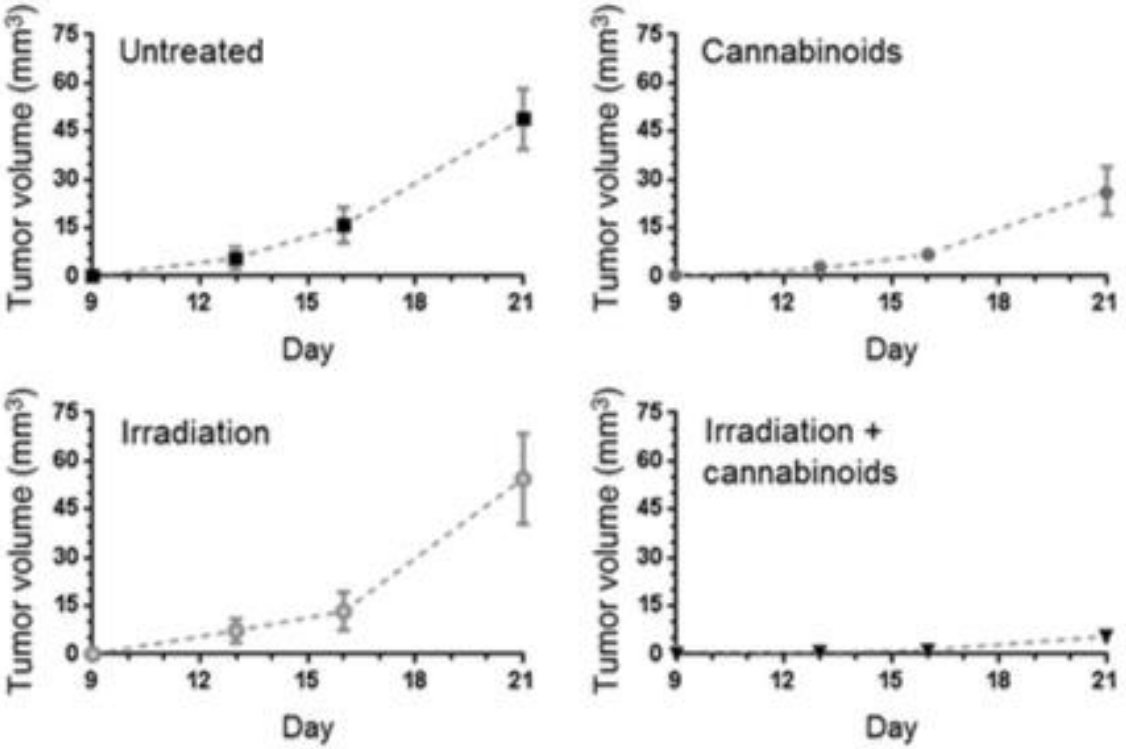
Published OnlineFirst November 14, 2014; DOI: 10.1158/1535-7163.MCT-14-0402

Molecular Cancer Therapeutics

Small Molecule Therapeutics

The Combination of Cannabidiol and Δ^9-Tetrahydrocannabinol Enhances the Anticancer Effects of Radiation in an Orthotopic Murine Glioma Model

Katherine A. Scott, Angus G. Dalgleish, and Wai M. Liu

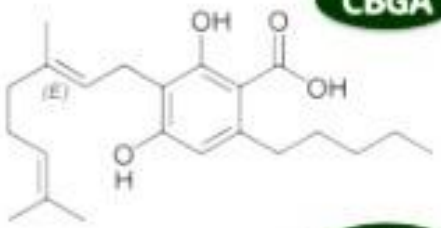


The Horizon for Medical Cannabis:

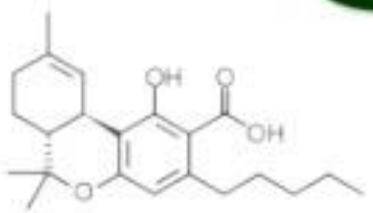
Epilepsia
Envelhecimento
Câncer
Dor neuropática
Esclerose múltipla
Autismo
Mal de Parkinson
Doença de Alzheimer
Depressão
Ansiedade
….

NATURAL CANNABINOIDS

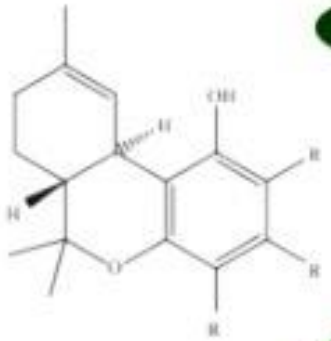
CBGA



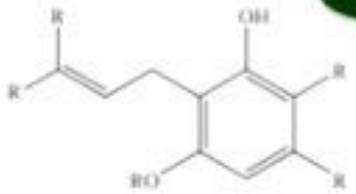
THCa



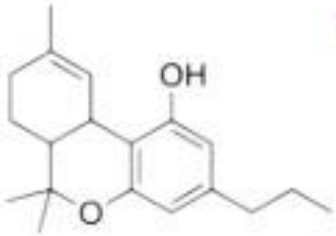
THC



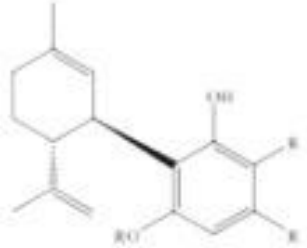
CBG



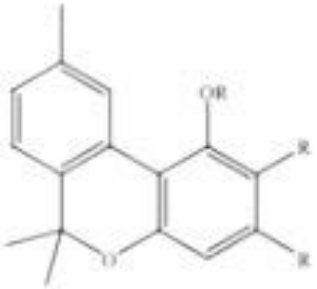
THCV



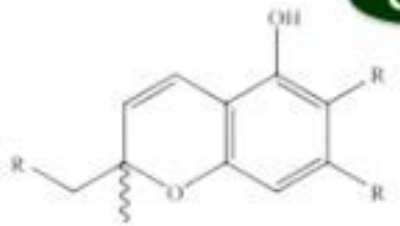
CBD



CBN



CBC



BJP British Journal of Pharmacology

DOI:10.1111/j.1476-5381.2011.01238.x
www.brjpharmacol.org

Themed Issue: Cannabinoids in Biology and Medicine, Part I

REVIEW

Taming THC: potential cannabis synergy and phytocannabinoid-terpenoid entourage effects

Ethan B Russo

GW Pharmaceuticals, Salisbury, Wiltshire, UK

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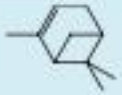
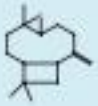
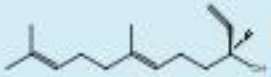
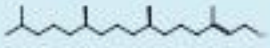
Keywords
cannabinoids; terpenoids; essential oils; THC; CBD; limonene; pinene; linalool; caryophyllene; phytotherapy

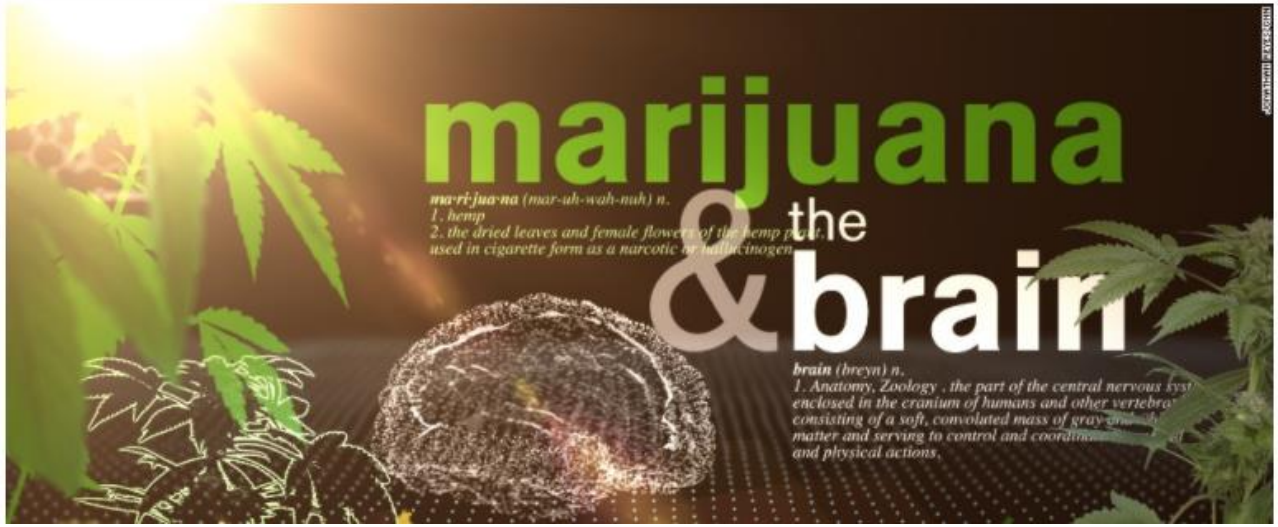
Received
19 November 2010
Revised
29 December 2010
Accepted
12 January 2011

Terpenoid	Structure	Commonly encountered in	Pharmacological activity (Reference)	Synergistic cannabinoid
Limonene		 Lemon	Potent AD/immunostimulant via inhalation (Komori *et al.*, 1995)	CBD
			Anxiolytic (Carvalho-Freitas and Costa, 2002; Pultrini Ade *et al.*, 2006) via 5-HT$_{1A}$ (Komiya *et al.*, 2006)	CBD
			Apoptosis of breast cancer cells (Vigushin *et al.*, 1998)	CBD, CBG
			Active against acne bacteria (Kim *et al.*, 2008)	CBD
			Dermatophytes (Sanguinetti *et al.*, 2007; Singh *et al.*, 2010)	CBG
			Gastro-oesophageal reflux (Harris, 2010)	THC
α-Pinene		 Pine	Anti-inflammatory via PGE-1 (Gil *et al.*, 1989)	CBD
			Bronchodilatory in humans (Falk *et al.*, 1990)	THC
			Acetylcholinesterase inhibitor, aiding memory (Perry *et al.*, 2000)	THC?, CBD
β-Myrcene		 Hops	Blocks inflammation via PGE-2 (Lorenzetti *et al.*, 1991)	CBD
			Analgesic, antagonized by naloxone (Rao *et al.*, 1990)	CBD, THC
			Sedating, muscle relaxant, hypnotic (do Vale *et al.*, 2002)	THC
			Blocks hepatic carcinogenesis by aflatoxin (de Oliveira *et al.*, 1997)	CBD, CBG
Linalool		 Lavender	Anti-anxiety (Russo, 2001)	CBD, CBG?
			Sedative on inhalation in mice (Buchbauer *et al.*, 1993)	THC
			Local anesthetic (Re *et al.*, 2000)	THC
			Analgesic via adenosine A$_{1A}$ (Peana *et al.*, 2006)	CBD
			Anticonvulsant/anti-glutamate (Elisabetsky *et al.*, 1995)	CBD, THCV, CBDV
			Potent anti-leishmanial (do Socorro *et al.*, 2003)	?
β-Caryophyllene		 Pepper	AI via PGE-1 comparable phenylbutazone (Basile *et al.*, 1988)	CBD
			Gastric cytoprotective (Tambe *et al.*, 1996)	THC
			Anti-malarial (Campbell *et al.*, 1997)	?
			Selective CB$_2$ agonist (100 nM) (Gertsch *et al.*, 2008)	THC
			Treatment of pruritus? (Karsak *et al.*, 2007)	THC
			Treatment of addiction? (Xi *et al.*, 2010)	CBD
Caryophyllene Oxide		 Lemon balm	Decreases platelet aggregation (Lin *et al.*, 2005)	THC
			Antifungal in onychomycosis comparable to ciclopiroxolamine and sulconazole (Yang *et al.*, 1999)	CBC,CBG
			Insecticidal/anti-feedant (Bettarini *et al.*, 1993)	THCA, CBGA
Nerolidol		 Orange	Sedative (Binet *et al.*, 1972)	THC, CBN
			Skin penetrant (Cornwell and Barry, 1994)	–
			Potent antimalarial (Lopes *et al.*, 1999, Rodrigues Goulart *et al.*, 2004)	?
			Anti-leishmanial activity (Arruda *et al.*, 2005)	?
Phytol		 Green tea	Breakdown product of chlorophyll	–
			Prevents Vitamin A teratogenesis (Arnhold *et al.*, 2002)	–
			↑GABA via SSADH inhibition (Bang *et al.*, 2002)	CBG

Medical marijuana and 'the entourage effect'

By Dr. Sanjay Gupta, CNN chief medical correspondent

Updated 1:58 PM ET, Tue March 11, 2014



Synthetic Cannabinoids (K2/Spice)

DrugFacts

Revised February 2018

Es Español

PDF (434KB)

Cite this article

More DrugFacts

- Health Effects of Specific Drugs
- Effects of Drug Use
- Prevention and Treatment
- Survey Data

What are synthetic cannabinoids?

Synthetic cannabinoids are human-made mind-altering chemicals that are either sprayed on dried, shredded plant material so they can be smoked or sold as liquids to be vaporized and inhaled in e-cigarettes and other devices. These products are also known as herbal or liquid incense.

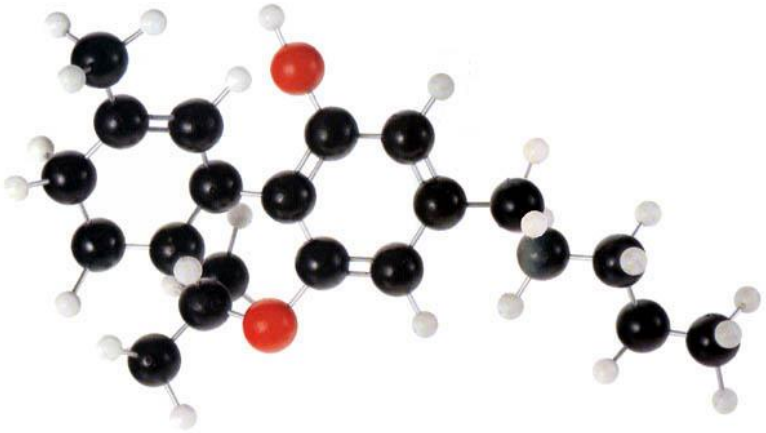
These chemicals are called *cannabinoids* because they are similar to chemicals found in the marijuana plant. Because of this similarity, synthetic cannabinoids are sometimes misleadingly called "synthetic marijuana" (or "fake weed"), and they are often marketed as safe, legal alternatives to that drug. In fact, they are not safe and may affect the brain much more powerfully than marijuana; their actual effects can be unpredictable and, in some cases, more dangerous or even life-threatening.

Additional Drug Facts

Qual é melhor?

Planta inteira?

Molécula isolada?



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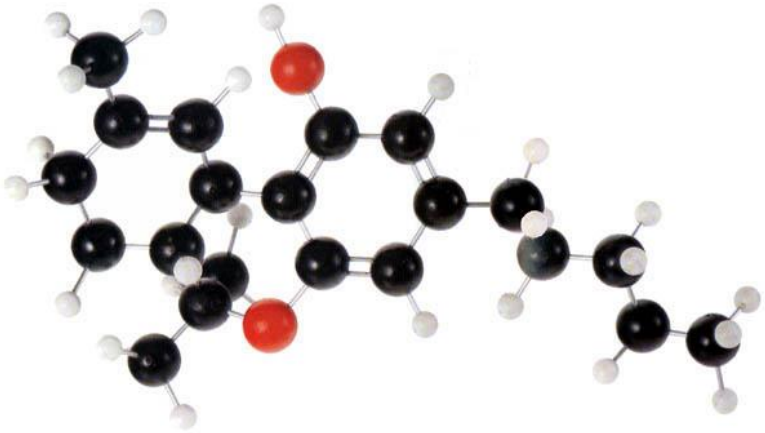

Depende!

A Cannabis está para a medicina do século XXI como os antibióticos estiveram para a medicina do século XX:

Uma grande revolução

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Uma grande revolução

Será acessível para todos?

https://www.drogasil.com.br/mevatyl-spray-3-frascos-10ml-cada-b1.html

Apps | Brain Institute | Calendar | Home - PubMed -... | The New York Tim... | CNN.com Internat...

DROGASIL

O que deseja encontrar?

Compre por Categoria

Início /

~R$ 2.800 por 30 ml

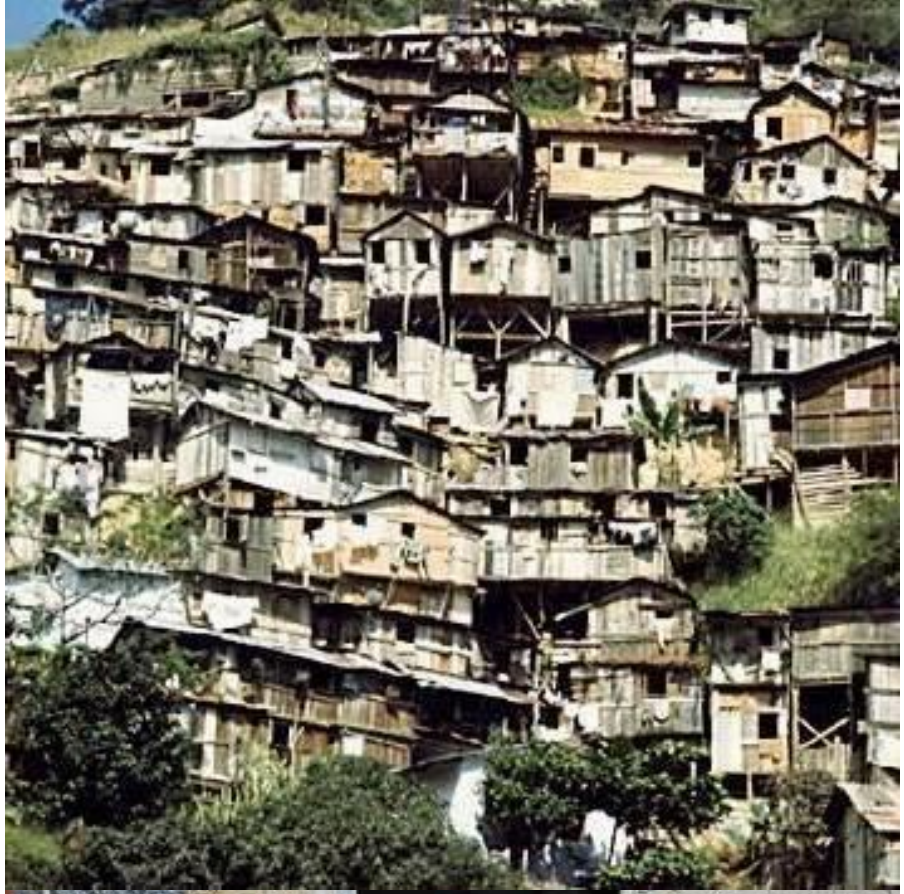
10ml Frasco Spray - Contém 3 Frascos
TETRAIDROCANABINOL,CANABIDIOL

0 de 5 (0)

É UM MEDICAMENTO.
SEU USO PODE TRAZER RISCOS. PROCURE UM MÉDICO OU UM FARMACÊUTICO. LEIA A BULA.

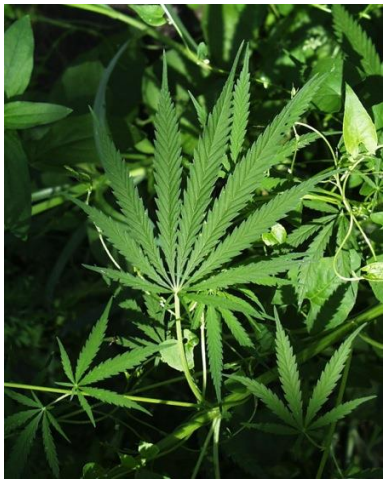
MEDICAMENTOS PODEM CAUSAR EFEITOS INDESEJADOS. EVITE A AUTOMEDICAÇÃO: INFORME-SE COM O FARMACÊUTICO.

+ detalhes



Comer frutas e vegetais provê nutrição pior do que a ingestão de vitaminas?

A maconha é benéfica? A maconha é perigosa? Devemos legalizar a maconha?



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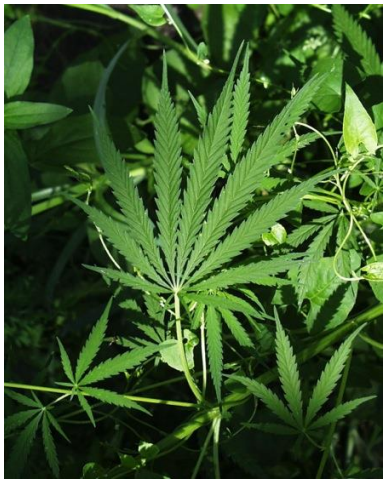

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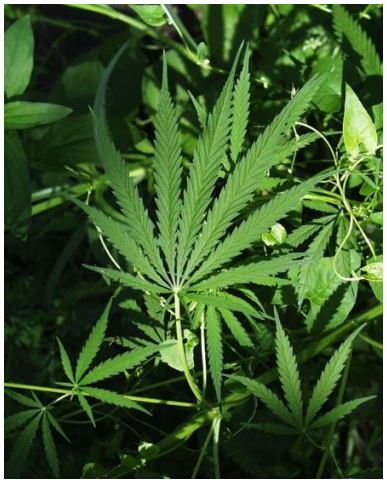

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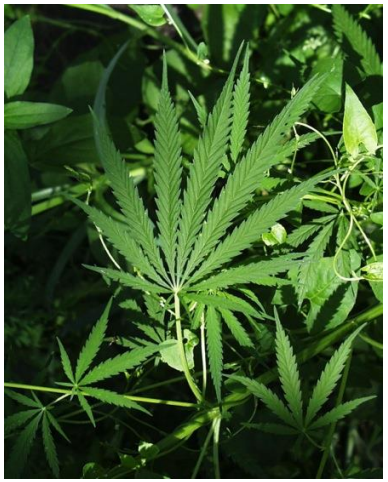

Assim como a maconha, os cães foram criados por nossos ancestrais para satisfazer diversas necessidades humanas através da seleção artificial de raças com diferentes utilidades

A maconha é benéfica? A maconha é perigosa?
Devemos legalizar a maconha?

O cão é benéfico? O cão é perigoso?
Devemos legalizar o cão?

Para atender a população da forma mais ampla é preciso garantir:

1)Auto-cultivo e Cooperativismo para produção de extratos de maconha;
2)Suporte tecnológico de universidades e institutos de pesquisas para dosagem de canabinóides e controle de qualidade;
3)Eco-sistema empresarial de medicina canábica com alta diversidade e livre de oligopólios;
4)Inclusão na economia canábica das comunidades vulneráveis mais afetadas pela guerra às drogas