

Medical Marijuana

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Please use the following links to access these sub-chapters:

Supporting Organizations - " [Medicinal Cannabis - Supporting Organizations](#) " *lists of organizations that support the medicinal use of cannabis.*

Data - " [Medicinal Cannabis - Data](#) " *data concerning medicinal cannabis ordered by data year and subject of the data in parentheses.*

Law and Policy - " [Medicinal Cannabis - Law and Policy](#) " *information concerning the legal status of medicinal cannabis and efforts to change that status.*

Research - " [Medicinal Cannabis - Research](#) " *clinical research studies concerning various applications of medicinal cannabis, with the subject of the research in italicized parentheses.*

IOM Report - " [Institute of Medicine - Marijuana and Medicine: Assessing the Science Base - 1999](#) " *quotes from the 1999 Institute of Medicine Report, "Marijuana and Medicine: Assessing the Science Base."*

In PDF format, this one-page flyer, entitled "Clinical Research Concerning Cannabis," lists 12 conditions for which research suggests that cannabis or cannabinoids might be a useful treatment. The flyer can be found at <http://mapinc.org/url/Rr2BR72F> .

1.

(medical cannabis - clinical studies) "By design CMCR [Center for Medicinal Cannabis Research] clinical studies focused on conditions identified by the Institute of Medicine for which cannabis might have potential therapeutic effects, based on current scientific knowledge (Institute of Medicine, 1999). To date, four CMCR-funded studies have demonstrated that cannabis has analgesic effects in pain conditions secondary to injury (e.g. spinal cord injury) or disease (e.g. HIV disease, HIV drug therapy) of the nervous system ... This suggests that cannabis may provide a treatment option for those individuals who do not respond or respond inadequately to currently available therapies. The efficacy of cannabis in treatment-refractory patients also may suggest a novel mechanism of action not fully exploited by current therapies. In addition to nerve pain, CMCR has also supported a study on muscle spasticity in Multiple Sclerosis (MS). Such spasticity can be painful and disabling, and some patients do not benefit optimally from existing treatments. The results of the CMCR study suggest that cannabis reduces MS spasticity, at least in the short term, beyond the benefit available from usual medical care."

Source:

Center for Medicinal Cannabis Research, "Report to the Legislature and Governor of the State of California presenting findings pursuant to SB847 which created the CMCR and provided state funding," University of California, (San Diego, CA: February 2010), p. 2.

http://cdc.coop/docs/neuropathic_pain_cmcr.pdf

2.

(medical cannabis - plant source of cannabinoids) "In the tip of secreting hairs located mainly on female-plant flowers and, in a smaller amount, in the leaves of cannabis plant, there are resin glands that have a considerable amount of chemically related active compounds, called cannabinoids. In some varieties of cannabis the main cannabinoid is the psychoactive component of the plant, delta9-tetrahydrocannabinol (delta9-THC). Cannabis varieties typically bred for fiber are nearly always relatively low in delta9-THC, cannabidiol (CBD) being the predominant cannabinoid in these plants."

Source:

Zuardi, Antonio Waldo, "Cannabidiol: from an inactive cannabinoid to a drug with wide spectrum of action," Revista Brasileira de Psiquiatria (Sao Paulo, Brazil: September 2008) Volume 30, No. 3, p. 272.

<http://www.scielo.br/pdf/rbp/v30n3/a15v30n3.pdf>

3.

(medical cannabis - cannabinoids) "Some 483 natural constituents have been identified in marijuana, including approximately 66 compounds that are classified as cannabinoids (Ross and El Sohly, 1995). Cannabinoids are not known to exist in plants other than marijuana, and most of the cannabinoid compounds that occur naturally have been identified chemically."

Source:

Drug Enforcement Administration, "Denial of Petition To Initiate Proceedings To Reschedule Marijuana," Federal Register, Vol. 76, No. 131, Friday, July 8, 2011, p. 40554.

http://americansforsafeaccess.org/downloads/CRC_Petition_DEA_Answer.pdf

4.

(medical cannabis - endocannabinoid system) "The plant *Cannabis sativa* produces over 421 chemical compounds, including about 80 terpeno-phenol compounds named phytocannabinoids that have not been detected in any other plant [1–4]. For obvious reasons, most attention has been paid to [delta]9-tetrahydrocannabinol ([delta]9-THC), which is the most psychotropic component and binds specific Gprotein-coupled receptors named cannabinoid (CB1 and CB2) receptors [5,6]. The discovery of a specific cell membrane receptor for [delta]9-THC was followed by isolation and identification of endogenous (animal) ligands termed endocannabinoids. The two main endocannabinoids are anandamide (which is metabolized mostly by fatty acid amide hydrolase (FAAH)) and 2-arachidonoylglycerol (which is mostly degraded by monoglyceride lipase (MAGL)) [5,6]. Cannabinoid receptors, endogenous ligands that activate them, and the mechanisms for endocannabinoid biosynthesis and inactivation constitute the 'endocannabinoid system.' With its ability to modulate several physiological and pathophysiological processes (e.g. neurotransmitter release in the central and peripheral nervous system, pain perception, and cardiovascular, gastrointestinal and liver functions), the endocannabinoid system represents a potential target for pharmacotherapy [6]."

Source:

Izzo, Angelo A.; Borrelli, Francesca; Capasso, Raffaele; Di Marzo, Vincenzo; and Mechoulam, Raphael, "Non-psychotropic plant cannabinoids: new therapeutic opportunities from an ancient herb," Trends in Pharmacological Sciences (London, United Kingdom: October 2009) Vol. 30, Issue 10, pp. 515-516.

<http://www.ncbi.nlm.nih.gov/pubmed/19729208>

<http://cannabisinternational.org/info/Non-Psychoactive-Cannabinoids.pdf>

5.

(medical cannabis - effects of cannabinoids) "Cannabinoids, the active components of Cannabis sativa and their derivatives, act in the organism by mimicking endogenous substances, the endocannabinoids, that activate specific cannabinoid receptors. Cannabinoids exert palliative effects in patients with cancer and inhibit tumour growth in laboratory animals.

"The best-established palliative effect of cannabinoids in cancer patients is the inhibition of chemotherapy-induced nausea and vomiting.

"Other potential palliative effects of cannabinoids in cancer patients — supported by Phase III clinical trials — include appetite stimulation and pain inhibition.

"Cannabinoids inhibit tumour growth in laboratory animals. They do so by modulating key cell-signalling pathways, thereby inducing direct growth arrest and death of tumour cells, as well as by inhibiting tumour angiogenesis and metastasis.

"Cannabinoids are selective antitumour compounds, as they can kill tumour cells without affecting their non-transformed counterparts. It is probable that cannabinoid receptors regulate cell-survival and cell-death pathways differently in tumour and nontumour cells.

"Cannabinoids have favourable drug-safety profiles and do not produce the generalized toxic effects of conventional chemotherapies. ... "

Source:

Guzman, Manuel, "Cannabinoids: Potential Anticancer Agents." Nature Reviews: Cancer (October 2003), p. 746.

http://www.brainlife.org/reprint/2003/guzm%C3%A1n_m031000.pdf

6.

(medical cannabis - components of the cannabis plant) "Essentially a herbal cannabinoid drug, the resin-secreting flowers of select varieties of the female cannabis plant contain approximately 6 dozen of different phytocannabinoids or plant-derived cannabinoids; these compounds are generally classified structurally as terpenophenolics with a 21-carbon molecular scaffold.²⁴ Other compounds, such as terpenoids, flavonoids, and phytosterols, which are common to many other botanicals, are also produced by cannabis and have some demonstrated pharmacologic properties.^{25,26} The best known naturally produced analgesic cannabinoids generally found in highest concentrations are THC and cannabidiol. They occur in their acid forms in herbal cannabis and must be decarboxylated to become activated. Five minutes of heating at 200 to 210°C has been determined as the optimal conditions for maximal decarboxylation; with a flame, where temperatures of 600°C are achieved, only a few seconds are needed.²⁷ "

Source:

Aggarwal, Sunil K., "Cannabinergic Pain Medicine: A Concise Clinical Primer and Survey of Randomized-controlled Trial Results," *Clinical Journal of Pain* (Philadelphia, PA: February 23, 2012), p. 2.

<http://www.ncbi.nlm.nih.gov/pubmed/22367503>

7.

(medical cannabis - categories of cannabinoid medicine) "They [cannabinoid medicines] fall into three categories: single molecule pharmaceuticals, cannabis-based liquid extracts, and phytocannabinoid-dense botanicals—the main focus of this article (Figure 2). The first category includes US Food and Drug Administration (FDA)-approved synthetic or semisynthetic single molecule cannabinoid pharmaceuticals available by prescription. Currently, these are dronabinol, a Schedule III drug and nabilone, a Schedule II drug. Though both are also used offlabel, dronabinol, a (-)-trans-[delta]9-tetrahydrocannabinol (THC) isomer found in natural cannabis, has been approved for two uses since 1985 and 1992, respectively: the treatment of nausea and vomiting associated with cancer chemotherapy in patients who have failed to respond adequately to conventional antiemetic treatments and the treatment of anorexia associated with weight loss in patients with AIDS.^{10,11} Nabilone, a synthetic molecule shaped similarly to THC, has also been approved since 1985 for use in the treatment of nausea and vomiting associated with cancer chemotherapy.^{12,13}

"The second category of cannabinoid medicines being used in the United States includes a line of cannabis-based medicinal extracts developed by several companies. The industry leader is GW Pharmaceuticals, a UK-based biopharmaceutical company whose lead product is currently undergoing FDA-approved, multisite Phase IIb clinical trials for the treatment of opioid-refractory cancer pain in the United States¹⁴ and has received prior approval for Phase III clinical trials in the United States. This botanical drug extract which goes by the nonproprietary name nabiximols has already secured approval in Canada for use in the treatment of central neuropathic pain in multiple sclerosis (in 2005) and in the treatment of intractable cancer pain (in 2007).¹⁵ It is also available on a named patient basis in the United Kingdom and Catalonia,^{16,17} a scheme which allows a doctor to prescribe an unlicensed drug to a particular "named patient," and has been exported to 22 countries to date.

"The third category of cannabinoid medicines currently being used in the United States includes the Schedule I medicinal plant *Cannabis sativa* L. itself, which, while currently unavailable for general prescription use in the United States, is in use in the context of two active controlled clinical trials, ^{18,19} 33 completed controlled clinical trials, ²⁰⁻⁵² and one on-going, yet essentially defunct, three-decade investigational clinical study. ^{53,54} "

Source:

Aggarwal, Sunil K.; Carter, Gregory T.; Sullivan, Mark D.; ZumBrunnen, Craig; Morrill, Richard; and Mayer, Jonathan D., "Medicinal use of cannabis in the United States: Historical perspectives, current trends, and future directions" *Journal of Opioid Management*, (Weston, Massachusetts: May/June 2009) Vol. 5:3, pp. 153-154.

<http://www.ncbi.nlm.nih.gov/pubmed/19662925>

http://www.letfreedomgrow.com/cmu/JOM_5-3-03-Carter.pdf

8.

(medical cannabis - safety) "On September 6, 1988, the Drug Enforcement Administration's [DEA] Chief Administrative Law Judge, Francis L. Young, ruled, "Placement [of a drug] in Schedule II would mean, essentially, that physicians in the United States would not violate Federal law by prescribing marijuana for their patients for legitimate therapeutic purposes. It is contrary to Federal law for physicians to do this so long as marijuana remains in Schedule I. ...

"Marijuana, in its natural form, is one of the safest therapeutically active substances known to man. By any measure of rational analysis, marijuana can be safely used within a supervised routine of medical care. ...

"The administrative law judge recommends that the Administrator [of the DEA] conclude that the marijuana plant considered as a whole has currently accepted medical use in treatment in the United States, that there is no lack of accepted safety for use of it under medical supervision and that it may lawfully be transferred from Schedule I to Schedule II."

Source:

US Department of Justice, Drug Enforcement Administration, "In the Matter of Marijuana Rescheduling Petition," [Docket #86-22], (September 6, 1988), pp. 6, 58, 68.

<http://www.iowamedicalmarijuana.org/pdfs/young.pdf>

9.

(medical cannabis - safety) "Generally, as analgesics, cannabinoids have minimal toxicity and present no risk of lethal overdose. ⁴⁸ End-organ failure secondary to medication effect has not been described and no routine laboratory monitoring is required in patients taking these medications."

Source:

Aggarwal, Sunil K., "Cannabinergic Pain Medicine: A Concise Clinical Primer and Survey of Randomized-controlled Trial Results," *Clinical Journal of Pain* (Philadelphia, PA: February 23, 2012), p. 3.

<http://www.ncbi.nlm.nih.gov/pubmed/22367503>

10.

(medical cannabis - United States Patent No. 6,630,507 for cannabinoids) "Cannabinoids have been found to have antioxidant properties, unrelated to NMDA [(N-methyl-D-aspartic acid] receptor antagonism. This new found property makes cannabinoids useful in the treatment and prophylaxis of wide variety of oxidation associated diseases, such as ischemic, age-related, inflammatory and autoimmune diseases. The cannabinoids are found to have particular application as neuroprotectants, for example in limiting neurological damage following ischemic insults, such as stroke and trauma, or in the treatment of neurodegenerative diseases, such as Alzheimer's disease, Parkinson's disease and HIV dementia. Nonpsychoactive cannabinoids, such as cannabidoil, are particularly advantageous to use because they avoid toxicity that is encountered with psychoactive cannabinoids at high doses useful in the method of the present invention."

Source:

United States Patent No. 6,630,507. Hampson, et al. October 7, 2003.

<http://patft.uspto.gov/netacgi/nph-Parser?Sect1=PTO1&Sect2=HITOFF&d=PALL...>

11.

(medical cannabis - Compassionate IND program) "... the National Institute on Drug Abuse has provided medical marijuana to a handful of patients (never more than 32, currently 4 surviving) as the outcome of the settlement in a lawsuit pressed in 1976 by a man with cannabis-responsive glaucoma. That settlement became the basis for the FDA's Compassionate Investigational New Drug Study program for patients with marijuana responsive conditions. No patient has been enrolled since 1992, when the George H. W. Bush administration suspended new registration in reaction to a large influx of applications from AIDS patients."

Source:

Bostwick, J. Michael, "Blurred Boundaries: The Therapeutics and Politics of Medical Marijuana," Mayo Clinic Proceedings (Rochester, MN: Mayo Clinic, February 2012), Vol. 87, No. 2, p. 182.

<http://download.journals.elsevierhealth.com/pdfs/journals/0025-6196/PIIS...>

12.

(medical cannabis - Compassionate IND program) "The Food and Drug Administration's claim that "marijuana has no currently accepted medical use in treatment in the United States" is undermined by the ongoing supply of medical cannabis to four seriously ill patients under the federal Compassionate Investigational New Drug (IND) program. ⁴¹ These patients, having first proved medical necessity (often to the courts), have been supplied by NIDA with medicinal cannabis for the past several decades. Furthermore, a privately funded study of these patients confirmed that they benefited from their use of medical cannabis. ⁴² "

Source:

Americans for Safe Access, "The Obstruction of Medical Cannabis Research in the U.S.: A Review of the Growing Controversy Regarding a Federal Monopoly on the Supply of Medical Cannabis for Research," (Washington, DC: April 2009), p. 9.

[http://americansforsafeaccess.org/downloads/Research_Obstruction_Report....](http://americansforsafeaccess.org/downloads/Research_Obstruction_Report...)

13.

(medical cannabis - dronabinol - definition) "Dronabinol (Δ -9-tetrahydrocannabinol [THC]) is an alternative treatment for nausea and vomiting caused by chemotherapy. THC is the principal psychoactive component of marijuana. Its mechanism of antiemetic action is unknown, but cannabinoids bind to opioid receptors in the forebrain and may indirectly inhibit the vomiting center. Dronabinol is administered in doses of 5 mg/m² po 1 to 3 h before chemotherapy, with repeated doses q 2 to 4 h after the start of chemotherapy (maximum of 4 to 6 doses/day). However, it has variable oral bioavailability, is not effective for inhibiting the nausea and vomiting of platinum-based chemotherapy regimens, and has significant adverse effects (eg, drowsiness, orthostatic hypotension, dry mouth, mood changes, visual and time sense alterations). Smoking marijuana may be more effective. Marijuana for this purpose can be obtained legally in some states. It is used less commonly because of barriers to availability and because many patients cannot tolerate smoking."

Editor's Notes

1. " Dronabinol , the active ingredient in MARINOL® (dronabinol) Capsules, is synthetic delta-9-tetrahydrocannabinol (delta-9-THC). Delta-9-tetrahydrocannabinol is also a naturally occurring component of Cannabis sativa L. (Marijuana)."

2. " Dronabinol is a name of a particular isomer of a class of chemicals known as tetrahydrocannabinols (THC). Specifically, dronabinol is the United States Adopted Name (USAN) for the (-)-isomer of [Delta]9-(trans)- tetrahydrocannabinol [(-)-[Delta]9-(trans)-THC], which is believed to be the major psychoactive component of the cannabis plant (marijuana)."

3. "A United States Adopted Name (USAN) is the "US generic name for any compound to be used as a drug."

4. Dronabinol is the generic name for THC or tetrahydrocannabinol.

Source:

Chabner, Bruce A. and Thompson, Elizabeth Chabner, "Management of Adverse Effects," The Merck Manual (Whitehouse Station, N.J: Merck & Co. Inc., July 2009), Section: Hematology and Oncology, Chapter: Management of Adverse Effects, Nausea and Vomiting.

<http://www.merckmanuals.com/professional/sec11/ch149/ch149c.html#sec11-c...>

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"MARINOL® (dronabinol) Capsules," (Abbott Laboratories: Abbott Park, IL, July 2006), pp. 11.

http://www.accessdata.fda.gov/drugsatfda_docs/label/2006/018651s025s026l...

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Federal Register, "Listing of Approved Drug Products Containing Dronabinol in Schedule III," Vol. 75, No. 210, Monday, November 1, 2010, pp. 67054 to 67059.

<http://edocket.access.gpo.gov/2010/pdf/2010-27502.pdf>

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"United States Adopted Name," The Bantam medical dictionary, p. 685.

<http://mapinc.org/url/IRc4R0vb>

14.

(medical cannabis - Marinol[®] - product label)

MARINOL[®] (dronabinol) Capsules

"DESCRIPTION

"Dronabinol is a cannabinoid designated chemically as (6aR-trans)-6a,7,8,10a-tetrahydro-6,6,9-trimethyl-3-pentyl-6H-dibenzo[b,d]pyran-1-ol.

"Dronabinol, the active ingredient in MARINOL[®] (dronabinol) Capsules, is synthetic delta-9-tetrahydrocannabinol (delta-9-THC). Delta-9-tetrahydrocannabinol is also a naturally occurring component of *Cannabis sativa L.* (Marijuana).

"Capsules for oral administration: MARINOL Capsules is supplied as round, soft gelatin capsules containing either 2.5 mg, 5 mg, or 10 mg dronabinol.

"CLINICAL PHARMACOLOGY

"Pharmacodynamics

"After oral administration, dronabinol has an onset of action of approximately 0.5 to 1 hours and peak effect at 2 to 4 hours. Duration of action for psychoactive effects is 4 to 6 hours, but the appetite stimulant effect of dronabinol may continue for 24 hours or longer after administration.

"INDICATIONS AND USAGE

"MARINOL Capsules is indicated for the treatment of:

"1. anorexia associated with weight loss in patients with AIDS; and

"2. nausea and vomiting associated with cancer chemotherapy in patients who have failed to respond adequately to conventional antiemetic treatments.

"ADVERSE REACTIONS"

"A cannabinoid dose-related "high" (easy laughing, elation and heightened awareness) has been reported by patients receiving MARINOL® Capsules in both the antiemetic (24%) and the lower dose appetite stimulant clinical trials (8%)

"DRUG ABUSE AND DEPENDENCE"

"MARINOL Capsules is one of the psychoactive compounds present in cannabis, and is abusable and controlled [Schedule III (CIII)] under the Controlled Substances Act. Both psychological and physiological dependence have been noted in healthy individuals receiving dronabinol, but addiction is uncommon and has only been seen after prolonged high dose administration.

"Chronic abuse of cannabis has been associated with decrements in motivation, cognition, judgement, and perception. The etiology of these impairments is unknown, but may be associated with the complex process of addiction rather than an isolated effect of the drug. No such decrements in psychological, social or neurological status have been associated with the administration of MARINOL Capsules for therapeutic purposes.

"In an open-label study in patients with AIDS who received MARINOL Capsules for up to five months, no abuse, diversion or systematic change in personality or social functioning were observed despite the inclusion of a substantial number of patients with a past history of drug abuse.

"OVERDOSAGE"

"Signs and symptoms following MILD MARINOL Capsules intoxication include drowsiness, euphoria, heightened sensory awareness, altered time perception, reddened conjunctiva, dry mouth and tachycardia; following MODERATE intoxication include memory impairment, depersonalization, mood alteration, urinary retention, and reduced bowel motility; and following SEVERE intoxication include decreased motor coordination, lethargy, slurred speech, and postural hypotension. Apprehensive patients may experience panic reactions and seizures may occur in patients with existing seizure disorders.

"MARINOL is a registered trademark of Unimed Pharmaceuticals, Inc. and is Manufactured by Banner Pharmacaps, Inc. High Point, NC 27265"

Editor's Note:

Marinol® is now marketed by Abbott Laboratories. Abbott pricing can be accessed from the link in the citation.

Source:

"MARINOL® (dronabinol) Capsules," (Abbott Laboratories: Abbott Park, IL, July 2006), pp. 1, 2, 6, 9, 10, 11, and 13.

<http://global.abbottgrowth.com/static/wma/pdf/1/2/8/2/8/Marinollabel.pdf>

<http://www.fda.gov/ohrms/dockets/dockets/05n0479/05N-0479-emc0004-04.pdf>

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Abbott Marinol® pricing as of 2/27/11:

<http://mapinc.org/url/WQiRxgLB>

http://www.accessdata.fda.gov/drugsatfda_docs/label/2006/018651s025s026l...

15.

(medical cannabis - history - pain relief) "The concept of deadening pain by artificial means is very ancient. Herodotus, Pliny and Dioskorides mention drugs that were employed for the purpose. Mandragora was used by Italian physicians. The Skyths of olden time inhaled the vapor of hemp to produce intoxication, and we have read of a Chinese physician who anaesthetized his patients with a preparation of Cannabis, in order to obviate the pains of surgical operations."

Source:

Wilder, Alexander, "History of Medicine: Medical History from the Earliest Historic Period with an Extended Account of the Various Sects of Physicians and New Schools of Medicine in later Centuries," Maine Farmer Publishing Company (Augusta, Maine: 1904), p. 296.

<http://ia600306.us.archive.org/14/items/historyofmedicin00wild/historyof...>

16.

(medical cannabis - history) "The first known mention of cannabis as a medicine appears in the world's oldest known medical text, the *Pen Ts'ao Ching* . Apparently composed by Emperor Shen-Nung around 2800 B.C., the oldest written copy dates back to the first century and suggests that cannabis may be useful in treating hundreds of conditions, including rheumatism, menstrual fatigue, and malaria."

Source:

Lucas, Philippe G, "Regulating compassion: an overview of Canada's federal medical cannabis policy and practice," Harm Reduction Journal (London, United Kingdom: January 28, 2008) Vol. 5, Article 5

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2267789/pdf/1477-7517-5-5.pdf...>

17.

(medical cannabis - history) "For most of American history, growing and using marijuana was legal under both federal law and the laws of the individual states. By the 1840s, marijuana's therapeutic potential began to be recognized by some U.S. physicians. From 1850 to 1941 cannabis was included in the United States Pharmacopoeia as a recognized medicinal. ⁴ By the end of 1936, however, all 48 states had enacted laws to regulate marijuana. ⁵ Its decline in medicine was hastened by the development of aspirin, morphine, and then other opium-derived drugs, all of which helped to replace marijuana in the treatment of pain and other medical conditions in Western medicine. ⁶ "

Source:

Eddy, Mark, "Medical Marijuana: Review and Analysis of Federal and State Policies," Congressional Research Service (Washington, DC: March 31, 2009), p. 1.

<http://www.fas.org/sgp/crs/misc/RL33211.pdf>

18.

(medicinal cannabis - history) "Cannabis indica became available in American pharmacies in the 1850's following its introduction to western medicine by William O'Shaughnessy (1839). ⁶ In its original pharmaceutical usage, it was regularly consumed orally, not smoked. The first popular American account of cannabis intoxication was published in 1854 by Bayard Taylor, writer, world traveler and diplomat."

Source:

Geiringer, Dale, "Origins of Cannabis Prohibition in California" Contemporary Drug Problems," originally published as "The Forgotten Origins of Cannabis Prohibition in California," Contemporary Drug Problems, (Summer 1999 - substantially revised June 2006) Vol 26, #2, p. 4.

<http://www.canorml.org/background/caloriginsmjproh.pdf>

19.

(medical cannabis - use in pain management) "In addition to their millennia-long role in spiritual practice and inebriation, cannabis-based preparations have had an extensive history in pain management, ¹ as documented in the materia medica of ancient civilizations, including those of India, Egypt, China, the Middle East, and elsewhere. ² Cannabis-based preparations were produced and sold by numerous major pharmaceutical houses such as Eli Lilly from the mid-1850s to the early 1940s and were significantly utilized during that time in Western medical practice for their analgesic and antispasmodic properties with reported success. ^{3,4} This is evidenced, for example, by Sir William Osler, MD's recommendation of "Cannabis indica" as "probably the most satisfactory remedy" in the treatment of migraine in the first modern textbook of internal medicine in 1892 (the most recent edition of this textbook was published in 2001) ⁵ and by a nuanced 1887 description of the unique analgesic effects of cannabinoid-based extractions on pain perception published by Penn Clinical Professor Dr Hobart Amory Hare who conducted clinical, animal, and self-experiments: "During the time that this remarkable drug is relieving pain a very curious psychical condition sometimes manifests itself; namely, that the diminution of the pain seems to be due to its fading away in the distance, so that the pain becomes less and less, just as the pain in a delicate ear would grow less and less as a beaten drum was carried farther and farther out of the range of hearing." ⁶

Source:

Aggarwal, Sunil K., "Cannabinergic Pain Medicine: A Concise Clinical Primer and Survey of Randomized-controlled Trial Results," Clinical Journal of Pain (Philadelphia, PA: February 23, 2012), p. 1.

<http://www.ncbi.nlm.nih.gov/pubmed/22367503>

20. Medicinal Cannabis - Supporting Organizations

(medical cannabis - medical and scientific organizations based in the United States that support access to therapeutic cannabis)

The American Academy of Family Physicians (1989, 1995); American Academy of HIV Medicine (2003); American College of Physicians (2008); American Medical Association's Council on Scientific Affairs (2001); American Medical Students Association (1993); American Nurses Association (2003); American Preventive Medical Association (1997); American Public Health Association (1995); Association of Nurses in AIDS Care (1999); Federation of American Scientists (1994); HIV Medicine Association (2006); Institute of Medicine (1982 & 1999); Kaiser Permanente (1997); Lymphoma Foundation of America (1997); National Association for Public Health Policy (1998); National Nurses Society on Addictions (1995); and Physicians Association for AIDS Care.

Source:

Patients out of Time, "Organizations Supporting Access to Therapeutic Cannabis," (Howardsville, VA: January 2009)

<http://www.medicalcannabis.com/Healthcare-Professionals/supporting-organ...>

21.

(medical cannabis - medical and scientific organizations not based in the United States that support access to therapeutic cannabis)

Australian National Task Force on Cannabis (1994); Australian Medical Association (New South Wales) Limited (1999); British Medical Association; Bundesverband Poliomyelitis (Federal Union for Polio), Germany (1998); Canadian AIDS Society (2004); Canadian Medical Association (2001); Deutsche Epilipsievereinigung (German Association for Epilepsy - 1998); Deutsche Gesellschaft für Algesiologie (German Society for Algesiology - 1998); Deutsche Gesellschaft für Drogen- und Suchtmedizin (German Society for Drug and Addiction Medicine - 1998); French Ministry of Health (1997); Health Canada (1997); House of Lords (UK) Select Committee on Science and Technology (1999); Medical Association of Jamaica (2001); Preventive Medical Center, Netherlands (1993); and Schmerztherapeutisches Kolloquium (Society for Pain Therapists), Germany (1998).

Source:

Patients out of Time, "Organizations Supporting Access to Therapeutic Cannabis," (Howardsville, VA: January 2009)

<http://www.medicalcannabis.com/Healthcare-Professionals/supporting-organ...>

22.

(medical cannabis - medical and scientific organizations based in the United States that support research concerning therapeutic cannabis)

American Academy of Addiction Psychiatry (2000); American Academy of Family Physicians (1977); American Cancer Society (1997); American Nurses Association (2003); American Society of Addiction Medicine (2000); Association of Nurses in AIDS Care (1999); Council of Health Organizations (1971); Federation of American Scientists (1995); HIV Medicine Association (2006); and National Institute of Health Workshop on the Medical Utility of Marijuana (1997).

Source:

Patients out of Time, "Organizations Supporting Access to Therapeutic Cannabis," (Howardsville, VA: January 2009)

<http://www.medicalcannabis.com/Healthcare-Professionals/supporting-organ...>

23.

(medical cannabis - endorsement by editorial boards) A few of the editorial boards that have endorsed medical access to marijuana include: *Boston Globe* ; *Chicago Tribune* ; *Miami Herald* ; *Denver Post* ; *Los Angeles Times* ; *New York Times* ; *Orange County Register* ; and *USA Today* .

Source:

Media Awareness Project on "cannabis - medicinal": <http://mapinc.org/url/lqqXJnTy>

24.

(medical cannabis - position of the American Nurses Association) "Summary: The evidence demonstrates a connection between therapeutic use of marijuana and symptom relief. The American Nurses Association actively supports patients' rights to legally and safely utilize marijuana for symptom management and health care practitioners' efforts to promote quality of life for patients needing such therapy."

Source:

"In Support of Patients' Safe Access to Therapeutic Marijuana," ANA Board of Directors (Silver Spring, MD: American Nurses Association, December 12, 2008), pp. 3-4.

<http://www.nursingworld.org/MainMenuCategories/EthicsStandards/Ethics-Po...>

25.

(medical cannabis - California Medical Association) "CMA [California Medical Association] policy has acknowledged the criminalization of cannabis to be a failed public health policy (HOD 704a-09) and has recognized a public movement toward the legalization of cannabis (HOD 101a-10). Cannabis illegality has perpetuated the effective prohibition of clinical research

on the properties of cannabis and has prevented the development of state and national standards governing the cultivation, manufacture, and labeling of cannabis products, similar to those governing food, tobacco and alcohol products, most of which are promulgated by federal agencies."

Source:

"Cannabis and the Regulatory Void: Background Paper and Recommendations," California Medical Association (Sacramento, CA: 2011), 11.

<http://www.cmanet.org/files/pdf/news/cma-cannabis-tac-white-paper-101411...>

26.

(medical cannabis - position of Veterans Administration) "If a Veteran obtains and uses medical marijuana in manner consistent with state law, testing positive for marijuana would not preclude the Veteran from receiving opioids for pain management in the Department of Veteran Affairs (VA) facility. The Veteran would need to inform his provider of the use of medical marijuana, and of any other non-VA prescribed medications he or she is taking to ensure that all medications, including opioids, are prescribed in a safe manner. Standard pain management agreements should draw a clear distinction between use of illegal drugs, and legal medical marijuana. However, the discretion to prescribe, or not prescribe, opioids in conjunction with medical marijuana, should be determined on clinical grounds, and thus will remain the decision of the individual health care provider. The provider will take the use of medical marijuana into account in all prescribing decisions, just as the provider would for any other medication. This is a case-by-case decision, based on the provider's judgment, and the needs of the patient."

Source:

Petzel, Robert A., Letter to Michael Krawitz from the Veterans Administration concerning its position on medical marijuana, (Washington, DC: Department of Veterans Affairs, Under Secretary for Health, July 6, 2010).

<http://www.veteransformedicalmarijuana.org/files/Undersecretary-Jun6.pdf>

27. Medicinal Cannabis - Data

(2010 - medical marijuana - legal states percent of U.S. population) According to the 2010 U.S. Census, 30% of the U.S. population or 93,806,417 individuals are covered by state medical marijuana laws.

Source:

"State and County QuickFacts," U.S. Census Bureau (Washington, DC: Department of Commerce, Economics and Statistics Administration, 2010).

<http://quickfacts.census.gov/qfd/index.html>

28.

(2009 - *estimated number of medical marijuana patients*) "Among 50-year-old high school graduates in 2009, we estimate that about three out of four (78%) have tried marijuana ... One in ten (10%) indicates using marijuana in the last 12 months ... Their past-month prevalence rates are lower — 5.9% ... for marijuana ... About 1 in 50 (2.0%) is a current daily marijuana user, though substantially more indicate that they have used marijuana daily at some time in the past."

Editor's note : The Monitoring the Future study provides daily marijuana U.S. usage estimates by age categories to age 50. These categories and daily usage rates for 2009 were:

Age

19-20 = 5.8%

21-22 = 6.3%

23-24 = 5.8%

25-26 = 5.1%

27-28 = 3.7%

29-30 = 5.4%

35 = 1.7%

40 = 2.1%

45 = 2.2%

50 = 2.0%

Assuming that those who use cannabis daily are medical users, the application of these percentages to comparable 2010 U.S.

Census categories for those age 18 to 55 would calculate estimated 5 million medical marijuana patients in the U.S.

Source:

Johnston, L. D., O'Malley, P. M., Bachman, J. G., & Schulenberg, J. E. (2010). "Monitoring the Future national survey results on drug use, 1975–2009: Volume II, College students and adults ages 19–50" (NIH Publication No. 10-7585). Bethesda, MD: National Institute on Drug Abuse. p 32 and p. 161.

http://monitoringthefuture.org/pubs/monographs/vol2_2009.pdf

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Middle Series Estimates of the Population by age, U.S. Census Bureau

http://www.census.gov/newsroom/releases/pdf/20101206_da_table_8.pdf

29.

(2009 - estimated number of medical cannabis patients) "Marijuana, the most commonly used illicit drug, was used by 6.0 percent of the population in 2007-2008 during the past month (Table B.3). States showing high prevalence rates for illicit drug use also had high prevalence rates for past month use of marijuana. Of the 10 States in the top fifth for past month use of an illicit drug among persons aged 12 or older, 9 States also were ranked in the top fifth for past month marijuana use: Alaska, Colorado, District of Columbia, Montana, New Hampshire, Oregon, Rhode Island, Vermont, and Washington (Figures 2.1 and 2.9).

"Seven States that ranked in the top fifth for past month marijuana use in all three age groups (12 to 17, 18 to 25, and 26 or older) and among persons 12 or older were Colorado, Maine, Montana, New Hampshire, Oregon, Rhode Island, and Vermont. (Figures 2.9 to 2.12). Iowa had the lowest rate of past month marijuana use in 2007-2008 (3.2 percent) in the 12 or older population, and Rhode Island had the highest rate (10.9 percent) (Table B.3)."

Editors Note: "Current use" of cannabis could be equated to medicinal use as users would likely consume the substance more than once per month. NSDUH reports state-based prevalence percentages that can be compared to state-based U.S. Census data to compute patient count estimates at the state level.

Source:

Substance Abuse and Mental Health Services Administration. (2010). "State Estimates of Substance Use from the 2007-2008 National Surveys on Drug Use and Health" (Office of Applied Studies, NSDUH Series H-37, HHS Publication No. SMA 10-4472). Rockville, MD., pp. 13-14.

<http://www.oas.samhsa.gov/2k8state/Ch2.pdf>

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For state level percentages, see Appendix C, Table C.3, pp. 182-183.

<http://www.oas.samhsa.gov/2k8state/AppC.pdf>

<http://www.oas.samhsa.gov/2k8state/MapMJmo.pdf>

30.

(2005 - state approved medical cannabis patients) "Determining exactly how many patients use medical marijuana with state approval is difficult. According to a 2002 study published in the Journal of Cannabis Therapeutics, an estimated 30,000 California patients and another 5,000 patients in eight other states possessed a physician's recommendations to use cannabis medically. ⁶⁷ More recent estimates are much higher. The New England Journal of Medicine reported in August 2005, for example, that an estimated 115,000 people have obtained marijuana recommendations from doctors in the states with programs. ⁶⁸

"Although 115,000 people may be approved medical marijuana users, the number of patients who have actually registered is much lower. A July 2005 CRS telephone survey of the state programs revealed a total of 14,758 registered medical marijuana users in eight states. ⁶⁹ (Maine and Washington do not maintain state registries, and Rhode Island, New Mexico, and Michigan had not yet passed their laws.) This number vastly understates the number of medical marijuana users, however, because California's state registry was in pilot status, with only 70 patients so far registered."

Source:

Eddy, Mark, "Medical Marijuana: Review and Analysis of Federal and State Policies," Congressional Research Service (Washington, DC: March 31, 2009), p. 19.

<http://www.fas.org/sgp/crs/misc/RL33211.pdf>

31.

(2005 - physician and patient acceptance of medical cannabis) "According to a survey of 400 physicians, both general practitioners and specialists in the Netherlands, which was performed just before the legal introduction of medicinal cannabis, only 6% said that they were under no condition willing to prescribe medicinal cannabis, while 60% to 70% regarded medicinal cannabis sufficiently socially accepted and would prescribe it if asked for by a patient. ⁴⁶ "

"Recently, a survey performed on 200 patients who were using medicinal cannabis during the first months after its introduction in the Netherlands was published. ⁴⁹ The survey showed that most of the respondents had previous experiences with cannabis use for medicinal purposes or with synthetic cannabinoids such as dronabinol, whereas a minority of 40% were "new" users. Most patients were satisfied using medicinal cannabis; only 10% of patients reported moderate to more severe transitory adverse effects. In about half of the users, the patients themselves took the initiative to suggest medicinal cannabis to

their treating physicians as a therapeutic option, whereas in about 30% of users the initiative was taken by the involved general practitioner or medical specialist. In the remaining 20% of users, it was a joint initiative of both patient and clinician."

Source:

de Jong, Floris A.; Engels, Frederike K.; Mathijssen, Ron H.J.; Zuylen, Lia van; and Verweij, Jaap, "Medicinal Cannabis in Oncology Practice: Still a Bridge Too Far?," *Journal of Clinical Oncology* (Alexandria, VA: American Society of Clinical Oncology, May 2005) Vol. 23, No. 13, p. 2889.

<http://jco.ascopubs.org/cgi/reprint/23/13/2886.pdf>

32.

(2004 - *scientific articles concerning medical cannabis*) "The length of this review, necessitated by the steady growth in the number of indications for the potential therapeutic use of cannabinoid-related medications, is a clear sign of the emerging importance of this field. This is further underlined by the quantity of articles in the public database dealing with the biology of cannabinoids, which numbered ~200 to 300/year throughout the 1970s to reach an astonishing 5900 in 2004. The growing interest in the underlying science has been matched by a growth in the number of cannabinoid drugs in pharmaceutical development from two in 1995 to 27 in 2004, with the most actively pursued therapeutic targets being pain, obesity, and multiple sclerosis (Hensen, 2005)."

Editors Note: A June 2010 search of Pubmed.gov from the National Library of Medicine found over 12,000 citations for biomedical literature concerning the terms "cannabis" or "cannabinoid." A February 2011 search of Pubmed.gov found over 13,000 such citations.

Source:

Pacher, Pal; Batkai, Sandor; and Kunos, George, "The Endocannabinoid System as an Emerging Target of Pharmacotherapy," *Pharmacological Reviews* (Bethesda, MD: American Society for Pharmacology and Experimental Therapeutics, September 2006), Vol. 58, No. 3. p. 441.

<http://pharmrev.aspetjournals.org/content/58/3/389.full.pdf>

33.

(*marijuana - safety*) The DEA's Administrative Law Judge, Francis Young concluded: "In strict medical terms marijuana is far safer than many foods we commonly consume. For example, eating 10 raw potatoes can result in a toxic response. By comparison, it is physically impossible to eat enough marijuana to induce death. Marijuana in its natural form is one of the safest therapeutically active substances known to man. By any measure of rational analysis marijuana can be safely used within the supervised routine of medical care."

Source:

US Department of Justice, Drug Enforcement Administration, "In the Matter of Marijuana Rescheduling Petition," [Docket #86-22], (September 6, 1988), p. 57.

<http://www.iowamedicalmarijuana.org/pdfs/young.pdf>

34. Medicinal Cannabis - Law and Policy

(medical cannabis - rescheduling) "States have led the medical marijuana movement largely because federal policymakers have consistently rejected petitions to authorize the prescription of marijuana as a Schedule II controlled substance that has both a risk of abuse and accepted medical uses. Restrictive federal law and, until recently, aggressive federal law enforcement have hamstrung research and medical practice involving marijuana."

"Medical experts emphasize the need to reclassify marijuana as a Schedule II drug to facilitate rigorous scientific evaluation of the potential therapeutic benefits of cannabinoids and to determine the optimal dose and delivery route for conditions in which efficacy is established. ² This research could provide the basis for regulation by the Food and Drug Administration. Current roadblocks to conducting clinical trials, however, make this more rational route of approval unlikely and perpetuate the development of state laws that lack consistency or consensus on basic features of an evidence-based therapeutic program."

Source:

Hoffman, Diane E., and Weber, Ellen, "Medical Marijuana and the Law," New England Journal of Medicine (Boston, MA: Massachusetts Medical Society, April 22, 2010), Vol. 362, No. 16, pp. 1453 and 1457.

<http://content.nejm.org/cgi/reprint/362/16/1453.pdf>

35.

(medical cannabis - legal states) Since 1996, sixteen states have enacted laws that allow the cultivation of medical marijuana and protect patients who possess medical marijuana (with their doctors' recommendations or certifications) from criminal penalties: **Alaska, Arizona, California, Colorado, Delaware, Hawaii, Maine, Michigan, Montana, Nevada, New Jersey, New Mexico, Oregon, Rhode Island, Vermont, Washington and Washington, DC.**

Ten of the thirteen did so through the initiative process. Hawaii's law was enacted by the legislature and signed by the

governor in 2000; Vermont's was enacted by the legislature and passed into law without the governor's signature in 2004; Rhode Island's was passed into law over the governor's veto in 2006; New Mexico's legislation was signed into law by Governor Bill Richardson in 2007; and on January 18, 2010, Governor Jon Corzine signed New Jersey's bill into law. In mid-December 2009, the United States Senate passed an omnibus appropriations bill that removed restrictions on the implementation of a marijuana initiative passed by District of Columbia voters in 1998; President Obama subsequently signed this bill into law on December 13, 2009. Delaware Governor Jack Markell (D) signed Senate Bill 17 into law on May 13, 2011.

Source:

Marijuana Policy Project, "State by State Medical Marijuana Laws" (Washington, DC: November 2008, Table 1, pp. 14-18.

http://docs.mpp.org/pdfs/download-materials/SBSR_NOV2008_1.pdf

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New Jersey: <http://www.mapinc.org/drugnews/v10/n052/a04.html>

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District of Columbia: <http://www.mapinc.org/drugnews/v09/n1115/a06.html>

36.

(medical cannabis - legal source of cannabis) "In 1968, the National Institute of Mental Health began funding a Drug Supply Program to provide researchers with compounds necessary to conduct biomedical research. Initially, the program focused on THC and other naturally occurring cannabinoids, and then gradually expanded to a wide range of compounds. ... Cannabis was among the first substances to be made available through the Drug Supply Program for use by scientists conducting both nonhuman research and human research under a variety of investigational new drug protocols. It was grown through a contract with the University of Mississippi. With its establishment in 1974, NIDA became the successor to NIMH as the administrator of the cannabis contract and the sole U.S. source for legal cannabis."

Source:

"Provision of Marijuana and Other Compounds For Scientific Research - Recommendations of The National Institute on Drug Abuse National Advisory Council," National Institute on Drug Abuse (Bethesda, MD: Department of Health and Human Services, National Institutes of Health, January 1998).

<http://archives.drugabuse.gov/about/organization/nacda/MarijuanaStatemen...>

37.

(medical cannabis - legal medicinal cannabis patients) "NIDA also supplies cannabis to seven patients under single patient so-called "compassionate use" Investigational New Drug Applications (IND). In 1978, as part of a lawsuit settlement by the Department of Health and Human Services, NIDA began supplying cannabis to patients whose physicians applied for and

received such an USID from the FDA. In 1992, the Secretary terminated this practice, but decided that NIDA should continue to supply those patients who were receiving cannabis at the time."

Source:

"Provision of Marijuana and Other Compounds For Scientific Research - Recommendations of The National Institute on Drug Abuse National Advisory Council," National Institute on Drug Abuse (Bethesda, MD: Department of Health and Human Services, National Institutes of Health, January 1998).

<http://archives.drugabuse.gov/about/organization/nacda/MarijuanaStatemen...>

38.

(medical cannabis - recommendations in legal states) According to a review by the General Accounting Office (GAO) of medical cannabis programs in four states, "Most medical marijuana recommendations in states where data are collected have been made for applicants with severe pain or muscle spasticity as their medical condition. Conditions allowed by the states' medical marijuana laws ranged from illnesses such as cancer and AIDS, to symptoms, such as severe pain. Information is not collected on the conditions for which marijuana has been recommended in Alaska or California. However, data from Hawaii's registry showed that the majority of recommendations have been made for the condition of severe pain or the condition of muscle spasticity. Likewise, data from Oregon's registry showed that, 84 percent of recommendations were for the condition of severe pain or for muscle spasticity."

Source:

General Accounting Office, "Marijuana: Early Experiences with Four States' Laws That Allow Use for Medical Purposes" (Washington, DC: Government Printing Office, Nov. 2002), GAO-03-189, p. 24.

<http://www.gao.gov/new.items/d03189.pdf>

39.

(medical cannabis - legalizing without Congress) "... the CSA [Controlled Substances Act] authorizes the Attorney General to do [legalize medical marijuana], in consultation with the Secretary of Health and Human Services and the DEA.¹⁴⁴ In other words, the President would not need the consent of the Congress to make this, more fundamental change to federal law.

"Such a move would sever the many heads of the prohibition hydra. Marijuana would be put on par with other medications—it would be legal, but controlled. Civil sanctions would no longer flow solely from the drug's illicit status. Civil RICO [Racketeer Influenced and Corrupt Organization statute] claims predicated on the distribution of medical marijuana would be dismissed even more readily. Preemption challenges would no longer threaten legal protections for marijuana users and dispensaries or derail proposed reforms designed to enhance state control over the medical marijuana trade. And DOJ [Department of Justice] officials could no longer prosecute medical marijuana users and dispensaries, regardless of where they lived in the country."

Source:

Miklos, Robert A., "A Critical Appraisal of the Department of Justice's New Approach to Medical Marijuana" (February 23, 2011). Stanford Law & Policy Review, Vol. 201, p. 101, 2011 ; Vanderbilt Public Law Research Paper No. 11-07, p. 134.

http://papers.ssrn.com/sol3/Delivery.cfm/SSRN_ID1768127_code219969.pdf?a...

40.

(medical cannabis - Attorney General Eric Holder 2009 letter on enforcement priorities) "The prosecution of significant traffickers of illegal drugs, including marijuana, and the disruption of illegal drug manufacturing and trafficking networks continues to be a core priority in the Department's efforts against narcotics and dangerous drugs, and the Department's investigative and prosecutorial resources should be directed towards these objectives. As a general matter, pursuit of these priorities should not focus federal resources in your States on individuals whose actions are in clear and unambiguous compliance with existing state laws providing for the medical use of marijuana. For example, prosecution of individuals with cancer or other serious illnesses who use marijuana as part of a recommended treatment regimen consistent with applicable state law, or those caregivers in clear and unambiguous compliance with existing state law who provide such individuals with marijuana, is unlikely to be an efficient use of limited federal resources. On the other hand, prosecution of commercial enterprises that unlawfully market and sell marijuana for profit continues to be an enforcement priority of the Department. To be sure, claims of compliance with state or local law may mask operations inconsistent with the terms, conditions, or purposes of those laws, and federal law enforcement should not be deterred by such assertions when otherwise pursuing the Department's core enforcement priorities.

"Typically, when any of the following characteristics is present, the conduct will not be in clear and unambiguous compliance with applicable state law and may indicate illegal drug trafficking activity of potential federal interest:

- unlawful possession or unlawful use of firearms;
- violence;
- sales to minors;
- financial and marketing activities inconsistent with the terms, conditions, or purposes of state law, including evidence of money laundering activity and/or financial gains or excessive amounts of cash inconsistent with purported compliance with state or local law;
- amounts of marijuana inconsistent with purported compliance with state or local law;
- illegal possession or sale of other controlled substances; or
- ties to other criminal enterprises."

Source:

United States Attorney General Eric Holder, "Investigations and Prosecutions in States Authorizing the Medical Use of Marijuana," Memorandum for Selected United States Attorneys, October 19, 2009.

<http://www.justice.gov/opa/documents/medical-marijuana.pdf>

41.

(medical cannabis - current scheduling) Despite its medical value, cannabis (marijuana) remains in Schedule I of the 1970 Controlled Substance Act where it is categorized as "(A) The drug or other substance has a high potential for abuse. (B) The drug or other substance has no currently accepted medical use in treatment in the United States. (C) There is a lack of accepted safety for use of the drug or other substance under medical supervision."

Source:

U.S. Code. Title 21, Chapter 13 -- Drug Abuse Prevention and Control -- Section 812, Schedules of Controlled Substances, p. 384.

[http://frwebgate.access.gpo.gov/cgi-bin/usc.cgi?ACTION=RETRIEVE&FILE=\\$\\$xa\\$\\$busc21.wais&start=2717826&SIZE=24600&TYPE=PDF](http://frwebgate.access.gpo.gov/cgi-bin/usc.cgi?ACTION=RETRIEVE&FILE=$$xa$$busc21.wais&start=2717826&SIZE=24600&TYPE=PDF)

<http://mapinc.org/url/1NCZaa7Q>

42.

(medical cannabis - exceptions to federal ban) "Only two limited exceptions to the federal ban on marijuana have been made. The first, a compassionate use program created under President Carter, is superficially analogous to extant state medical use programs; it allows patients to use marijuana legally for therapeutic purposes. The marijuana for the program is supplied by a federally approved grow-site at the University of Mississippi (the only federally approved grow-site in the United States). However, the program stopped accepting new applications in 1992, and only eight (yes, eight) patients currently receive marijuana through it. Over its entire history, only thirty-six patients have been enrolled.⁵² The second and only other way to obtain marijuana legally under federal law is by participating in an FDA-approved research study. But since the federal government approves so few marijuana research projects—eleven since 2000⁵³—only a small fraction of the population that currently qualifies for state exemptions could participate."

Source:

Miklos, Robert A., "On the Limits of Supremacy: Medical Marijuana and the States' Overlooked Power to Legalize Federal Crime," *Vanderbilt Law Review* (Nashville, TN: Vanderbilt University Law School, March 9, 2009), p. 113.

http://papers.ssrn.com/sol3/Delivery.cfm/SSRN_ID1478673_code219969.pdf?a...

43.

(medical cannabis - limits of Federal Supremacy) "Though Congress has banned marijuana outright through legislation that

has survived constitutional scrutiny, state laws legalizing medical use of marijuana not only remain in effect, they now constitute the de facto governing law in thirteen states. These state laws and most related regulations have not been—and, more interestingly, *cannot be*—preempted by Congress, given constraints imposed on Congress's preemption power by the anti-commandeering rule, properly understood. Just as importantly, these state laws *matter*; state legalization of medical marijuana has not only eliminated the most relevant legal barrier to using the drug, it has arguably fostered more tolerant personal and social attitudes toward the drug. In sum, medical marijuana use has survived and indeed thrived in the shadow of the federal ban. The war over medical marijuana may be largely over, though skirmishes will undoubtedly continue, but contrary to conventional wisdom, it is the states, and not the federal government, that have emerged the victors in this struggle. Supremacy, in short, has its limits."

Source:

Miklos, Robert A., "On the Limits of Supremacy: Medical Marijuana and the States' Overlooked Power to Legalize Federal Crime," *Vanderbilt Law Review* (Nashville, TN: Vanderbilt University Law School, March 9, 2009), p. 162.

http://papers.ssrn.com/sol3/Delivery.cfm/SSRN_ID1478673_code219969.pdf?a...

44.

(*medical cannabis - state legislation*) Since 1978, thirty-six states have enacted some form of medicinal cannabis legislation, most of which has never been operable because of the federal Controlled Substances Act (CSA).

These laws and the states that currently have them include:

Therapeutic Research Programs (allow patients to use cannabis through state-run therapeutic research programs; not operable because of federal obstruction): Alabama, California, Georgia, Illinois, Massachusetts, Minnesota, New Jersey, New York, South Carolina, Texas.

Symbolic Pseudo-Prescriptions (allow patients to possess cannabis if obtained through a prescription; not operable because the CSA bars physicians from writing prescriptions for Schedule I drugs like cannabis): Arizona, California, Connecticut, District of Columbia, Iowa, New Hampshire, Tennessee, Virginia, Wisconsin.

Rescheduling (some states have their own CSA which often mirrors federal scheduling, but can vary; not operable because federal scheduling supersedes state schedules): Alaska, Iowa, Montana, Tennessee, and the District of Columbia.

Non-binding Resolutions (legislation that urges the federal government to reschedule cannabis; largely symbolic): California, Michigan, Missouri, New Hampshire, New Mexico, Rhode Island, Washington.

Source:

Marijuana Policy Project, "State by State Medical Marijuana Laws" (Washington, DC: November 2008, pp. 11-12 and Table 2, pp. A-1-A-18).

http://www.mpp.org/assets/pdfs/download-materials/SBSR_NOV2008_1.pdf

45.

(medical cannabis - adolescent marijuana use in legal states) "Contrary to the fears expressed by opponents of medical marijuana laws, there is no evidence that the enactment of 10 state medical marijuana laws has produced an increase in adolescent marijuana use in those states or nationwide. Instead, data from those states suggest a modest decline overall, with very large declines in some age groups in some states. Overall, the decrease in teen marijuana use in medical marijuana states has slightly exceeded the national decline."

Source:

O'Keefe, Karen, "Marijuana Use by Young People: The Impact of State Medical Marijuana Laws," Marijuana Policy Project (Washington, DC: June 2011), p. 14.

<http://www.ukcia.org/research/ImpactOfStateMMJLaws.pdf>

46.

(medical cannabis - adolescent marijuana use in legal states) "Indeed, all 11 states that have passed medical marijuana laws ranked above the national average in the percentage of persons 12 or older reporting past-month use of marijuana in 1999, as shown in Table 2. It is at least possible, however, that this analysis confuses cause with effect. It is logical to assume that the states with the highest prevalence of marijuana usage would be more likely to approve medical marijuana programs, because the populations of those states would be more knowledgeable of marijuana's effects and more tolerant of its use."

"It is also the case that California, the state with the largest and longest-running medical marijuana program, ranked 34th in the percentage of persons age 12-17 reporting marijuana use in the past month during the period 2002-2003, as shown in Table 1. In fact, between 1999 and 2002-2003, of the 10 states with active medical marijuana programs, five states (AK, HI, ME, MT, VT) rose in the state rankings of past-month marijuana use by 12- to 17-year-olds and five states fell (CA, CO, NV, OR, WA).¹¹¹ Of the five states that had approved medical marijuana laws before 1999 (AK, AZ, CA, OR, WA), only Alaska's ranking rose between 1999 and 2002-2003, from 7th to 4th, with 11.08% of youth reporting past-month marijuana use in 2002-2003 compared with 10.4% in 1999. No clear patterns are apparent in the state-level data. Clearly, more important factors are at work in determining a state's prevalence of recreational marijuana use than whether the state has a medical marijuana program."

Source:

Eddy, Mark, "Medical Marijuana: Review and Analysis of Federal and State Policies," Congressional Research Service (Washington, DC: March 31, 2009), p. 32.

<http://www.fas.org/sgp/crs/misc/RL33211.pdf>

47.

(medical cannabis - The Netherlands - prescribed cannabis) "In 2003, the Opium Act was amended to legalise the medical use of cannabis. Since September 2003, prescribed medical cannabis is available at pharmacies for patients with indicated disorders."

Source:

Trimbos Institute, "Report to the EMCDDA by the Reitox National Focal Point, The Netherlands Drug Situation 2003" (Lisboa, Portugal: European Monitoring Centre for Drugs and Drug Addiction, Dec. 2003), p. 1.

http://www.emcdda.europa.eu/attachements.cfm/att_34350_EN_NR2003Netherla...

48.

(medical cannabis - ethics of prescribing cannabis) "Portions of the American Medical Association's Code of Medical Ethics, Opinion 1.02 – The Relation of Law and Ethics reads, "Ethical values and legal principles are usually closely related, but ethical obligations typically exceed legal duties. In some cases, the law mandates unethical conduct." "In exceptional circumstances of unjust laws, ethical responsibilities should supersede legal obligations." [56] An "exceptional circumstance of unjust laws" may be interpreted as the federal ban on cannabis for medical use. Sixteen states and the District of Columbia found the federal government's prohibition on prescribing and using medicinal cannabis so unjust as to create laws in direct violation of federal statute. Therefore, one could surmise that prescribing cannabis for the purpose of harm reduction is ethical even though it violates federal law. In addition, Hayry suggests that the idea of "freedom" also provides an ethical reason for prescribing cannabis and he writes, "... whatever the legal situation, respect for the freedom of the individual would imply that requests like this (for medicinal cannabis) should be granted, either by health professionals, or by society as a whole." [57]"

Source:

Collen, Mark, "Prescribing Cannabis for Harm Reduction," Harm Reduction Journal (London, United Kingdom: January 2012) Vol. 9, Issue 1, p. 5.

<http://www.harmreductionjournal.com/content/pdf/1477-7517-9-1.pdf>

49.

(medical cannabis - DEA recommendation to reschedule naturally-derived dronabinol [THC] to Schedule III of the CSA)

"On March 17, 2010, and June 1, 2010, the Assistant Secretary for Health, DHHS [Department of Health and Human Services], sent the Deputy Administrator of DEA scientific and medical evaluations and letters recommending that FDA approved drug products containing dronabinol (naturally-derived [from the cannabis plant] or synthetic) in sesame oil in a gelatin capsule (hard or soft) be placed into schedule III of the CSA [Controlled Substances Act]."

"The DHHS scheduling recommendation of March 17, 2010, concluded that drug products containing synthetic dronabinol in sesame oil and encapsulated in a hard gelatin capsule, have a similar potential for abuse as Marinol®."

"Based on the recommendations of the Assistant Secretary for Health, received in accordance with section 201(b) of the Act [21 U.S.C. 811(b)], and the independent review of the available data by DEA, the Deputy Administrator of DEA, pursuant to sections 201(a) and 201(b) of the Act [21 U.S.C. 811(a) and 811(b)], finds that FDA-approved generic dronabinol products, both naturally-derived or synthetically produced, in sesame oil and encapsulated in both hard gelatin or soft gelatin capsules meet the criteria for placement in schedule III set in 21 U.S.C. 812(b) ..."

"Dronabinol is a name of a particular isomer of a class of chemicals known as tetrahydrocannabinols (THC). Specifically, dronabinol is the United States Adopted Name (USAN) for the (-)-isomer of [Delta]9-(trans)-tetrahydrocannabinol (-)-[Delta]9-(trans)-THC, which is believed to be the major psychoactive component of the cannabis plant (marijuana)."

Source:

Federal Register, "Listing of Approved Drug Products Containing Dronabinol in Schedule III," Vol. 75, No. 210, Monday, November 1, 2010, pp. 67054 to 67059.

<http://edocket.access.gpo.gov/2010/pdf/2010-27502.pdf>

50.

(medical cannabis - U.S. Department of Housing and Urban Development position on use in public housing) "In sum, PHAs [Public Housing Agencies] and owners may not grant reasonable accommodations that would allow tenants to grow, use, or otherwise possess, or distribute medical marijuana, even if in doing so tenants are complying with state laws authorizing medical marijuana-related conduct. Further, PHAs and owners must deny *admission* to those applicant households with individuals who are, at the time of consideration for admission, using marijuana. See 42 U.S.C. § 13661(b)(1)(A); Lester Memorandum at 2.

"We note, however, that PHAs and owners have statutorily-authorized discretion with respect to evicting or refraining from evicting *current residents* on account of their use of medical marijuana. See 42 U.S.C. § 13662(b)(1); Lester

Memorandum at 5-7. If a PHA or owner desires to allow a resident who is currently using medical marijuana to remain as an occupant, the PHA or owner may do so as an exercise of that discretion, but not as reasonable accommodation. HUD regulations provide factors that PHAs and owners may consider when determining how to exercise their discretion to terminate tenancies because of current illegal drug use. *See* 24 C.F.R. § 966.4(1)(5)(vii)(B)(factors for PHAs); 5.852 (factors for PHAs and owners operating other assisted housing programs).

Source:

Kanovsky, Helen, R. "Medical Use of Marijuana and Reasonable Accommodation in Federal Public and Assisted Housing," U.S. Department of Housing and Urban Development (Washington, DC: January 20, 2011), pp. 10-11.

<http://www.scribd.com/doc/47657807/HUD-policy-Memo-on-Medical-Marijuana-...>

51. Medicinal Cannabis - Research

(medical cannabis - hindered research) "Evidence not only supports the use of medical marijuana in certain conditions but also suggests numerous indications for cannabinoids. Additional research is needed to further clarify the therapeutic value of cannabinoids and determine optimal routes of administration. The science on medical marijuana should not be obscured or hindered by the debate surrounding the legalization of marijuana for general use."

Source:

American College of Physicians. Supporting Research into the Therapeutic Role of Marijuana. Philadelphia: American College of Physicians; 2008: Position Paper. (Available from American College of Physicians, 190 N. Independence Mall West, Philadelphia, PA 19106.), p. 9.

http://www.acponline.org/advocacy/where_we_stand/other_issues/medmarijua...

52.

(medical cannabis - hindered research) "The natural next step — pharmaceutical development — has been thwarted by the federal government's seeming unwillingness to have new scientific discovery supplant long-standing ideology. Bureaucratic hurdles not erected for other potential pharmaceuticals continue to interfere with legitimate cannabis research. The federal government instituted its 1970 ban in the absence of scientific evidence supporting its position. It maintains the ban, despite scientific evidence suggesting that cannabis could have positive effects on the many organ systems endocannabinoid activity modulates."

Source:

Bostwick, J. Michael, "Blurred Boundaries: The Therapeutics and Politics of Medical Marijuana," Mayo Clinic Proceedings (Rochester, MN: Mayo Clinic, February 2012), Vol. 87, No. 2, p. 183.

<http://download.journals.elsevierhealth.com/pdfs/journals/0025-6196/PIIS...>

53.

(*medical cannabis - obstruction of research*) "... the federal government's position that "marijuana has no currently accepted medical use in treatment in the United States" is effectively kept in place by the obstruction of privately funded medical cannabis research.

"As a result of its monopoly on the supply of cannabis that can be legally used in federally-approved research, NIDA, a subdivision of the National Institutes of Health (NIH), oversees all cannabis research in the U.S. ¹⁴ and funds the vast majority of approved studies involving cannabis. While a nominal number of studies in the U.S. are aimed at investigating the medical efficacy of cannabis, mainly funded by the State of California's Center for Medicinal Cannabis Research (CMCR), NIDA focuses exclusively on the supposed harmful effects of the plant. One consequence of this focus can be found in NIDA's policy of underwriting the cannabis supplied for "drug abuse" research that it funds, whereas researchers studying medical efficacy are required to pay for research-grade cannabis at a price set by NIDA.

"At the time this report was issued [April 2009], only 14 cannabis studies were under way, 13 of which were NIDA-funded drug abuse studies. ¹⁵

"Even after the FDA approves medical cannabis research studies, those studies are still subject to additional approval that is not required for any other Schedule I substance. ¹⁷ Multiple researchers in the U.S. have been granted approval by the FDA to study medical cannabis, but have been significantly delayed or prevented from conducting their research at all as a result of NIDA's refusal to sell the cannabis. ¹⁸ "

Source:

Americans for Safe Access, "The Obstruction of Medical Cannabis Research in the U.S.: A Review of the Growing Controversy Regarding a Federal Monopoly on the Supply of Medical Cannabis for Research," (Washington, DC: April 2009), p. 4.

http://americansforsafeaccess.org/downloads/Research_Obstruction_Report....

54.

(medical cannabis - synopsis of CMCR published clinical study results)

“The Effect of Cannabis on Neuropathic Pain in HIV-Related Peripheral Neuropathy”

Donald I. Abrams, M.D., University of California, San Francisco

(cannabis and neuropathic pain) "The primary objective of this study was to evaluate the efficacy of smoked cannabis when used as an analgesic in persons with neuropathic pain from HIV-associated distal sensory polyneuropathy (DSPN) ... In a double blind, randomized, five-day clinical trial patients received either smoked cannabis or placebo cannabis cigarettes The full results of this study appear in the journal *Neurology* (Abrams, et al., 2007– see reference list) ... The study concluded that a significantly greater proportion of patients who smoked cannabis (52%) had a greater than 30% reduction in pain intensity compared to only 24% in the placebo group."

“Placebo-Controlled, Double Blind Trial of Medicinal Cannabis in Painful HIV Neuropathy”

Ronald J. Ellis, M.D., Ph.D., University of California, San Diego

(cannabis and HIV neuropathy) "The primary objective of this study also was to evaluate the efficacy of smoked cannabis when used as an analgesic in persons with HIV-associated painful neuropathy. In a double-blind, randomized, clinical trial of the short-term adjunctive treatment of neuropathic pain in HIV-associated distal sensory polyneuropathy, participants received either smoked cannabis or placebo cannabis cigarettes ... The full results of this study were published in the journal *Neuropsychopharmacology* (Ellis, et al., 2008 – see reference list) ... It was concluded that smoked cannabis was generally well-tolerated and effective when added to concomitant analgesic therapy in patients with medically refractory pain due to HIV-associated neuropathy."

“A Double-Blind, Placebo-Controlled Crossover Trial of the Antinociceptive Effects of Smoked Marijuana on Subjects with Neuropathic Pain“

Barth Wilsey, M.D., University of California, Davis

(cannabis and neuropathic pain) "This study's objective was to examine the efficacy of two doses of smoked cannabis on pain in persons with neuropathic pain of different origins (e.g., physical trauma to nerve bundles, spinal cord injury, multiple sclerosis, diabetes). In a double-blind, randomized clinical trial participants received either lowdose, high-dose, or placebo cannabis cigarettes ... The full results of this study have been published in the *Journal of Pain* (Wilsey, et al., 2008 – see reference list) ...The study concluded that both low and high cannabis doses were efficacious in reducing neuropathic pain of diverse causes."

“Analgesic Efficacy of Smoked Cannabis”

Mark Wallace, M.D., University of California, San Diego

(cannabis and neuropathic pain) "This study used an experimental model of neuropathic pain to determine whether pain induced by the injection into the skin of capsaicin, a compound which is the 'hot' ingredient in chili peppers, could be alleviated by smoked cannabis. Another aim of the study was to examine the effects of 'dose' of cannabis, and the time course

of pain relief. In a randomized double-blinded placebo controlled trial, volunteers smoked low, medium, and high dose cannabis (2%, 4%, 8% THC by weight) or placebo cigarettes ... The full results of this study were published in the journal *Anesthesiology* (Wallace, et al., 2007 – see reference list) ... In summary, this study suggested that there may be a 'therapeutic window' (or optimal dose) for smoked cannabis: low doses were not effective; medium doses decreased pain; and higher doses actually increased pain. These results suggest the mechanism(s) of cannabinoid analgesia are complex, in some ways like non-opioid pain relievers (e.g., aspirin, ibuprofen) and in others like opioids (e.g., morphine)."

“Short-Term Effects of Cannabis Therapy on Spasticity in Multiple-Sclerosis”

Jody Corey-Bloom, M.D., University of California, San Diego

(cannabis and muscle spasticity) "This objective of this study was to determine the potential for smoked cannabis to ameliorate marked muscle spasticity (chronic painful contraction of muscles), a severe and disabling symptom of multiple sclerosis ... In a placebo-controlled, randomized clinical trial spasticity and global functioning was examined before and after treatment with smoked cannabis ... Initial results were presented at the meeting of the American College of Neuropsychopharmacology in 2007 ... This study concluded that smoked cannabis was superior to placebo in reducing spasticity and pain in patients with multiple sclerosis, and provided some benefit beyond currently prescribed treatments."

“Vaporization as a ‘Smokeless’ Cannabis Delivery System”

Donald Abrams, M.D., University of California, San Francisco

(vaporization of cannabis) "The aim of this study was to evaluate the use of a vaporization system (the Volcano; VAPORMED® Inhalatoren; Tüttlingen, Germany) as a 'smokeless' delivery system for inhaled cannabis ... The full results of this study have been published in the journal *Clinical Pharmacology & Therapeutics* (Abrams, et al., 2007 – see reference list) ... In summary, vaporization of cannabis was found to be a safe mode of delivery, and participants had a preference for vaporization over smoking as a delivery system in this trial."

Source:

Center for Medicinal Cannabis Research, "Report to the Legislature and Governor of the State of California presenting findings pursuant to SB847 which created the CMCR and provided state funding," University of California, (San Diego, CA: February 2010), pp. 10-12.

http://cdc.coop/docs/neuropathic_pain_cmcr.pdf

55.

(medical cannabis - Sativex ®) "A marijuana-based medication for people suffering from multiple sclerosis and severe pain is expected to be approved for sale in Britain early this year, British officials say.

"The drug, Sativex, developed by GW Pharmaceuticals, a British company, is a liquid extract from marijuana grown by the company under license from the government. Developed to be sprayed under the tongue, it would be the first drug in recent decades to include all the components of the cannabis plant, advocates of medical marijuana say."

Source:

Tuller, David, "Britain Poised To Approve Medicine Derived From Marijuana, New York Times (New York, NY), Jan. 27, 2004.

<http://www.mapinc.org/drugnews/v04/n175/a06.html>

56.

(medical cannabis - breast cancer) "Our results, which were obtained in a clinically relevant animal model of ErbB2-positive breast cancer, suggest that these highly aggressive and low responsive tumors could be efficiently treated with nonpsychoactive CB2-selective agonists without affecting the surrounding healthy tissue."

From the abstract: "Conclusions: Taken together, these results provide a strong preclinical evidence for the use of cannabinoid-based therapies for the management of ErbB2-positive breast cancer."

Source:

Caffarel, María M; Andradas, Clara; Mira, Emilia; Pérez-Gómez, Eduardo; Cerutti, Camilla; Moreno-Bueno, Gema; Flores, Juana; García-Realm, Isabel; Palacios, José; Mañes, Santos; Guzmán, Manuel; Sánchez, Cristina, "Cannabinoids reduce ErbB2-driven breast cancer progression through Akt inhibition," *Molecular Cancer* (London, United Kingdom: July 22, 2010), p. 1 and P. 8.

<http://www.molecular-cancer.com/content/9/1/196>

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2917429/pdf/1476-4598-9-196....>

57.

(medical cannabis - breast cancer) "In conclusion, our data indicate that cannabidiol, and possibly *Cannabis* extracts enriched in this natural cannabinoid, represent a promising nonpsychoactive antineoplastic strategy. In particular, for a highly malignant human breast carcinoma cell line, we have shown here that cannabidiol and a cannabidiol-rich extract counteract cell growth both in vivo and in vitro as well as tumor metastasis in vivo. Cannabidiol exerts its effects on these cells through a combination of mechanisms that include either direct or indirect activation of CB2 and TRPV1 receptors and induction of oxidative stress, all contributing to induce apoptosis."

Source:

Ligresti, Alessia; Moriello, Aniello Schiano; Starowicz, Katarzyna; Matias, Isabel; Pisanti, Simona; De Petrocellis, Luciano; Laezza, Chiara; Portella, Giuseppe; Bifulco, Maurizio; and Di Marzo, Vincenzo, "Antitumor Activity of Plant Cannabinoids with Emphasis on the Effect of Cannabidiol on Human Breast Carcinoma," *The Journal of Pharmacology and Experimental Therapeutics* (Bethesda, MD: The American Society for Pharmacology and Experimental Therapeutics, March 2004) Vol. 318, No. 3, pp. 1386-1387.

<http://jpet.aspetjournals.org/content/318/3/1375.full.pdf>

58.

(medical cannabis - cancer) "... we show that cannabinoid administration selectively down-regulates MMP-2 [matrix metalloproteinases] expression in mice bearing gliomas as well as in two patients with recurrent glioblastoma multiforme. Cannabinoid-induced inhibition of MMP-2 expression was also evident in cultured glioma cells, indicating that the changes observed in gliomas in vivo reflect—at least in part—the direct effect of cannabinoids on tumor cells. MMP-2 expression is upregulated in almost all human cancers, including gliomas, and this has been shown to be closely associated with negative prognosis."

"As MMP-2 up-regulation is associated with high progression and poor prognosis of gliomas and many other tumors, MMP-2 downregulation constitutes a new hallmark of cannabinoid antitumoral activity."

Source:

Cristina Bla'zquez, Mari'a Salazar, Arkaitz Carracedo, Mar Lorente, Ainara Egia, Luis Gonza'lez-Feria, Amador Haro, Guillermo Velasco, and Manuel Guzman, "Cannabinoids Inhibit Glioma Cell Invasion by Down-regulating Matrix Metalloproteinase-2 Expression," *Cancer Research* (March 2008), pp. 1951 and 1945.

<http://cancerres.aacrjournals.org/cgi/reprint/68/6/1945.pdf>

59.

(medical cannabis - cancer) "Cannabinoids have a favourable drug safety profile. Acute fatal cases due to cannabis use in humans have not been substantiated, and median lethal doses of THC in animals have been extrapolated to several grams per kilogram of body weight. Cannabinoids are usually well tolerated in animal studies and do not produce the generalized toxic effects of most conventional chemotherapeutic agents. For example, in a 2-year administration of high oral doses of THC to rats and mice, no marked histopathological alterations in the brain and other organs were found. Moreover, THC treatment tended to increase survival and lower the incidence of primary tumours. Similarly, long-term epidemiological surveys, although scarce and difficult to design and interpret, usually show that neither patients under prolonged medical cannabinoid treatment nor regular cannabis smokers have marked alterations in a wide array of physiological, neurological and blood tests."

Source:

Guzman, Manuel, "Cannabinoids: Potential Anticancer Agents." Nature Reviews: Cancer (October 2003), p. 752.

http://www.brainlife.org/reprint/2003/guzm%C3%A1n_m031000.pdf

60.

(medical cannabis - cancer) "In conclusion, a cannabinoid-based therapeutic strategy for neural diseases devoid of undesired psychotropic side effects could find in CBD [a cannabinoid] a valuable compound in cancer therapies along with the perspective of evaluating a synergistic effect with other cannabinoid molecules and/or with other chemotherapeutic agents as well as with radiotherapy. Whatever the precise mechanism underlying the CBD effects, the present results suggest a possible application of CBD as a promising, nonpsychoactive, antineoplastic agent."

Source:

Massi, Paola; Vaccani, Angelo; Ceruti, Stefania; Colombo, Arianna; Abbraccio, Maria P., and Parolaro, Daniela, "Antitumor Effects of Cannabidiol, a Nonpsychoactive Cannabinoid, on Human Glioma Cell Lines," The Journal of Pharmacology and Experimental Therapeutics (Bethesda, MD: The American Society for Pharmacology and Experimental Therapeutics, March 2004) Vol. 308, p. 845.

<http://jpet.aspetjournals.org/content/308/3/838.full.pdf>

61.

(medical cannabis - cancer) "Cannabinoids, the active components of marijuana and their other natural and synthetic analogues have been reported as useful adjuvants to conventional chemotherapeutic regimens for preventing nausea, vomiting, pain, and for stimulating appetite. Before the discovery of specific cannabinoid systems and receptors, it was speculated that cannabinoids produced their effects via nonspecific interaction with cell membranes. Cannabinoids are proving to be unique based on their targeted action on cancer cells and their ability to spare normal cells. Variation in the effects of cannabinoids in different cell lines and tumor model could be due to the differential expression of CB1 and CB2 receptors. Thus, overexpression of cannabinoid receptors may be effective in killing tumors, whereas low or no expression of these receptors could lead to cell proliferation and metastasis because of the suppression of the antitumor immune response."

Source:

Sarfraz, Sami; Adhami, Vaqar M.; Syed, Deeba N.; Afaq, Farrukh; and Mukhtar, Hasan, "Cannabinoids for Cancer Treatment: Progress and Promise," Cancer Research (Philadelphia, PA: American Association for Cancer Research, January 2008) Vol. 68, pp. 341-342.

<http://cancerres.aacrjournals.org/cgi/reprint/68/2/339.pdf>

62.

(medical cannabis - diabetic cardiomyopathy) "Remarkably, CBD attenuated myocardial dysfunction, cardiac fibrosis, oxidative/nitrative stress, inflammation, cell death, and interrelated signaling pathways. Furthermore, CBD also attenuated the high glucose-induced increased reactive oxygen species generation, nuclear factor- κ B activation, and cell death in primary human cardiomyocytes.

"Conclusions: Collectively, these results coupled with the excellent safety and tolerability profile of CBD in humans, strongly suggest that it may have great therapeutic potential in the treatment of diabetic complications, and perhaps other cardiovascular disorders, by attenuating oxidative/nitrative stress, inflammation, cell death and fibrosis."

Source:

Rajesh, Mohanraj; Mukhopadhyay, Partha; Batkai, Sandor; Patel, Vivek; Patel, Keita; Matsumoto, Shingo; Kashiwaya, Yoshihiro; Horvath, Béla; Mukhopadhyay, Bani; Becker, Lauren; Hasko, György; Liaudet, Lucas; Wink, David A.; Veves, Aristidis; Mechoulam, Raphael; Pacher, Pal, "Cannabidiol Attenuates Cardiac Dysfunction, Oxidative Stress, Fibrosis, and Inflammatory and Cell Death Signaling Pathways in Diabetic Cardiomyopathy," *Journal of the American College of Cardiology* (San Diego, CA: American College of Cardiology Foundation: December 2010) Vol. 56, No. 25, p. 2115.

<http://www.natap.org/2010/newsUpdates/marijuana.pdf>

<http://content.onlinejacc.org/cgi/content/abstract/56/25/2115>

63.

(medical cannabis - diabetic retinopathy) "Inflammation-mediated neurodegeneration is of utmost clinical relevance. Inflammation in neural tissues involves production of reactive oxygen species that stimulate cellular release of proinflammatory cytokines. ... Adenosine has been shown to mitigate the proinflammatory cytokine release response in central neural tissue."

"CBD [cannabidiol (CBD), a nonpsychotropic and nontoxic cannabinoid] has been shown to block NMDA-, LPS-, or diabetes induced retinal damage (El-Remessy AB, et al., manuscript submitted), ^{5,17} ... "

"Drugs that enhance extracellular adenosine signaling have been of clinical interest in treatment of inflammation after myocardial or cerebral ischemia. ^{25,26} CBD as an anti-inflammatory drug is an attractive alternative to smoking marijuana because of its lack of psychoactive effects. ²⁷ CBD is known to be nontoxic in humans, ²⁸ which has previously been a problem for other nucleoside inhibitor drugs. ^{29,30}

Source:

Liou, Gregory I.; Auchampach, John A.; Hillard, Cecilia J.; Zhu, Gu; Yousufzai, Bilal; Salman, Mian; Khan, Sohail; and Khalifa, Yousuf, "Mediation of Cannabidiol Anti-inflammation in the Retina by Equilibrative Nucleoside Transporter and A2A

Adenosine Receptor," Investigative Ophthalmology & Visual Science (Rockville, MD: Association for Research in Vision and Ophthalmology, December 2008), Vol. 49, No. 12, pp. 5530-5531.

<http://www.iovs.org/cgi/reprint/49/12/5526.pdf>

64.

(medical cannabis - diabetic retinopathy) "Recent evidence suggests that local inflammation plays a major role in the pathogenesis of diabetic retinopathy. The function of CBD as an antioxidant to block oxidative stress and as an inhibitor of adenosine reuptake to enhance a self-defense mechanism against retinal inflammation represents a novel therapeutic approach to the treatment of ophthalmic complications associated with diabetes."

Source:

Loiu, George, " Diabetic retinopathy: Role of inflammation and potential therapies for anti-inflammation, " World Journal of Diabetes (Beijing, China: Beijing Baishideng BioMed Scientific Co., March 15, 2010), p. 15.

<http://www.wjgnet.com/1948-9358/pdf/v1/i1/12.pdf>

65.

(medical cannabis - endocannabinoid deficiency) "Baker et al. have described how endocannabinoids may demonstrate an impairment threshold if too high, and a range of normal function below which a deficit threshold may be crossed [112]. Syndromes of CECD [Clinical Endocannabinoid Deficiency] may be congenital or acquired. In the former case, one could posit that genetically-susceptible individuals might produce inadequate endocannabinoids, or that their degradation is too rapid. The same conditions might be acquired in injury or infection."

Source:

Russo, Ethan, "Clinical Endocannabinoid Deficiency (CECD): Can this Concept Explain Therapeutic Benefits of Cannabis in Migraine, Fibromyalgia, Irritable Bowel Syndrome and other Treatment-Resistant Conditions?," Neuroendocrinology Letters (Stockholm, Sweden: Society of Integrated Sciences, Feb-Apr 2004) Nos.1/2, Vol.25, p. 38.

<http://www.ncbi.nlm.nih.gov/pubmed/18404144>

<http://www.freedomtoexhale.com/clinical.pdf>

66.

(medical cannabis - fibromyalgia) "We observe significant improvement of symptoms of FM [fibromyalgia] in patients using cannabis in this study although there was a variability of patterns. This information, together with evidence of clinical

trials and emerging knowledge of the endocannabinoid system and the role of the stress system in the pathophysiology of FM suggest a new approach to the suffering of these patients. The present results together with previous evidence seem to confirm the beneficial effects of cannabinoids on FM symptoms."

Source:

Fiz, Jimena; Durán, Marta; Capella, Dolors; Carbonel, Jordi; Farre, Magi, "Cannabis Use in Patients with Fibromyalgia: Effect on Symptoms Relief and Health-Related Quality of Life," PLoS Medicine (Cambridge, United Kingdom: Public Library of Science, April 2011) Vol. 6, Issue 4, p. 4.

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3080871/pdf/pone.0018440.pdf>

67.

(medical cannabis - gastrointestinal functioning) "The role of the endocannabinoid system in the control of GI functions under physiological and pathological conditions has recently received increased interest. Within the last 5 years, more than half of all studies on the roles of the endocannabinoid system in the GI tract have been published. The current state of knowledge of the physiology and pharmacology of cannabinoids has largely increased, providing new potential tools for the treatment of several GI diseases. The symptoms of the most common GI disorders, IBS and inflammatory bowel disease, affect more than 20% of the population in Western countries and cause great discomforts [106]. Intestinal cramping, nausea, chronic diarrhoea and inflammation are all symptoms onto which the cannabinoids may be effective. Cannabis derivatives and other newly developed cannabinoids may represent promising tools for the treatment of different GI disorders because they can act at multiple sites, covering a wide spectrum of symptoms."

Source:

Massa, Federico; Storr, Martin; and Lutz, Beat, "The endocannabinoid system in the physiology and pathophysiology of the gastrointestinal tract," Journal of Molecular Medicine (Berlin, Germany: August 26, 2005) Vol. 83, p. 951.

<http://www.springerlink.com/content/pj24p7323lp31105/fulltext.pdf>

68.

(medical cannabis - HIV and hepatitis C) "Short-term use of smoked cannabis did not affect viral load in 15 HIV-positive patients and also is associated with adherence to therapy and reduced viral loads in 16 patients with hepatitis C infections."

Source:

American Medical Association, Council on Science and Public Health, "Report 3 of the Council on Science and Public Health: Use of Cannabis for Medicinal Purposes" (December 2009), p. 15.

http://americansforsafeaccess.org/downloads/AMA_Report.pdf

69.

(medical cannabis - HIV) "This study provides evidence that short-term use of cannabinoids, either oral or smoked, does not substantially elevate viral load in individuals with HIV infection who are receiving stable antiretroviral regimens containing nelfinavir or indinavir. Upper confidence bounds for all estimated effects of cannabinoids on HIV RNA level from all analyses were no greater than an increase of 0.23 log₁₀ copies/mL compared with placebo. Because this study was randomized and analyses were controlled for all known potential confounders, it is very unlikely that chance imbalance on any known or unknown covariate masked a harmful effect of cannabinoids. Study participants in all groups may have been expected to benefit from the equivalent of directly observed antiretroviral therapy, as well as decreased stress and, for some, improved nutrition over the 25-day inpatient stay."

Source:

Abrams, Donald I., MD, et al., "Short-Term Effects of Cannabinoids in Patients with HIV-1 Infection - A Randomized, Placebo-Controlled Clinical Trial," *Annals of Internal Medicine*, Aug. 19, 2003, Vol. 139, No. 4 (American College of Physicians), p. 264.

<http://www.annals.org/content/139/4/258.full.pdf+html>

70.

(medical cannabis - HIV) "Conclusions: Smoked and oral cannabinoids did not seem to be unsafe in people with HIV infection with respect to HIV RNA levels, CD4+ and CD8+ cell counts, or protease inhibitor levels over a 21-day treatment."

Source:

Abrams, Donald I., MD, et al., "Short-Term Effects of Cannabinoids in Patients with HIV-1 Infection - A Randomized, Placebo-Controlled Clinical Trial," *Annals of Internal Medicine*, Aug. 19, 2003, Vol. 139, No. 4 (American College of Physicians), p. 258.

<http://www.annals.org/content/139/4/258.full.pdf+html>

71.

(medical cannabis - lymphoma) "In conclusion, our study demonstrates that the cannabinoid receptor agonists R(+)-MA and Win55 induce a sequence of signaling events leading to cell death of MCL cells. The requirement of ligation of both CB1 and CB2 [receptors] raises the possibility that cannabinoids may be used to selectively target MCL cells to undergo apoptosis."

Note: MCL is a malignant B-cell lymphoma with an aggressive course and generally a poor clinical outcome. MCL tumors respond to chemotherapy, but the remissions are short and the median survival is only 3 years."

Source:

Gustafsson, Kristin; Christensson, Birger; Sander, Birgitta; and Flygare, Jenny, "Cannabinoid Receptor-Mediated Apoptosis Induced by R(+)-Methanandamide and Win55,212-2 Is Associated with Ceramide Accumulation and p38 Activation in Mantle Cell Lymphoma," *Molecular Pharmacology* (Bethesda, MD: The American Society for Pharmacology and Experimental Therapeutics, August 2006), p. 1619.

<http://molpharm.aspetjournals.org/content/70/5/1612.full.pdf>

72.

(marijuana - regular adolescent use) In an ethnographic study of adolescents who were regular marijuana users, researchers at the University of British Columbia, concluded,

"Thematic analysis revealed that these teens differentiated themselves from recreational users and positioned their use of marijuana for relief by emphasizing their inability to find other ways to deal with their health problems, the sophisticated ways in which they titrated their intake, and the benefits that they experienced. These teens used marijuana to gain relief from difficult feelings (including depression, anxiety and stress), sleep difficulties, problems with concentration and physical pain. Most were not overly concerned about the risks associated with using marijuana, maintaining that their use of marijuana was not 'in excess' and that their use fit into the realm of 'normal.'

Conclusion: Marijuana is perceived by some teens to be the only available alternative for teens experiencing difficult health problems when medical treatments have failed or when they lack access to appropriate health care."

Source:

Bottorff, Joan L , Johnson, Joy L, Moffat, Barbara M, and Mulvogue, Tamsin, "Relief-oriented use of marijuana by teens," *Journal of Substance Abuse Treatment, Prevention, and Policy* (Vancouver, BC: April 2009), pp. 4-7.

<http://www.substanceabusepolicy.com/content/pdf/1747-597X-4-7.pdf>

73.

(marijuana - cannabis and memory) "Nevertheless, when considering all 15 studies (i.e., those that met both strict and more relaxed criteria) we only noted that regular cannabis users performed worse on memory tests, but that the magnitude of the effect was very small. The small magnitude of effect sizes from observations of chronic users of cannabis suggests that cannabis compounds, if found to have therapeutic value, should have a good margin of safety from a neurocognitive standpoint under the more limited conditions of exposure that would likely obtain in a medical setting."

Source:

Grant, Igor, et al., "Non-Acute (Residual) Neurocognitive Effects Of Cannabis Use: A Meta-Analytic Study," Journal of the International Neuropsychological Society (Cambridge University Press: July 2003), 9, pp. 687-8.

<http://www.csdp.org/research/348art2003.pdf>

74.

(medical cannabis - migraines) "The information reviewed above indicates that cannabis has a long established history of efficacy in migraine treatment. Clinical use of the herb and its extracts for headache has waxed and waned for 1200 years, or perhaps much longer, in a sort of cannabis interruptus. It is only contemporaneously that supportive biochemical and pharmacological evidence for the indication is demonstrable. Cannabis' unique ability to modulate various serotonergic receptor subtypes, inhibit glutamatergic-mediated toxicities, simultaneously provide antiinflammatory activity and provide acute symptomatic and chronic preventive relief make it unique among available treatments for this disorder."

Source:

Russo, Ethan, "Hemp for Headache: An In-Depth Historical and Scientific Review of Cannabis in Migraine Treatment," Journal of Cannabis Therapeutics (September 2000) Vol. 1, pp. 73-74.

http://www.drugpolicy.org/docUploads/hemp_for_headache.pdf

75.

(medical cannabis - morning sickness) "This study was designed to determine how therapeutic users of cannabis rate its effectiveness as an anti-emetic, and particularly as a treatment for nausea and vomiting of pregnancy. In general (not specific to pregnancy), the vast majority of our respondents considered cannabis to be extremely effective or effective as a therapy for nausea (93%) and vomiting (75%), and as an appetite stimulant (95%). In the context of pregnancy, cannabis was rated as extremely effective or effective by 92% of the respondents who had used it as a therapy for nausea and vomiting (morning sickness)."

Source:

Westfall, Rachel E.; Janssen, Patricia A.; Lucas, Philippe; and Capler, Rielle, "Survey of medicinal cannabis use among childbearing women: Patterns of its use in pregnancy and retroactive self-assessment of its efficacy against 'morning sickness,'" Contemporary Therapies in Clinical Practice (United Kingdom: November 2009) Vol. 15, Issue 4, p. 32.

<http://www.ncbi.nlm.nih.gov/pubmed/19880090>

http://safeaccess.ca/research/cannabis_nausea2006.pdf

76.

(medical cannabis - multiple sclerosis) "... there is evidence that cannabinoids may provide neuroprotective and anti-inflammatory benefits in MS. Neuroinflammation, found in autoimmune diseases such as MS, has been shown to be reduced by cannabinoids through the regulation of cytokine levels in microglial cells [25]. The therapeutic potential of cannabinoids in MS is therefore comprehensive and should be given considerable attention."

Source:

Lakhan, Shaheen E and Rowland, Marie, "Whole plant cannabis extracts in the treatment of spasticity in multiple sclerosis: a systematic review," BMC Neurology (Los Angeles, CA: Global Neuroscience Initiative Foundation, December 2009) Vol. 9, p. 63.

<http://www.biomedcentral.com/content/pdf/1471-2377-9-59.pdf>

77.

(medical cannabis - multiple sclerosis) "We saw a beneficial effect of smoked cannabis on treatment-resistant spasticity and pain associated with multiple sclerosis among our participants."

"Conclusion: Using an objective measure, we saw a beneficial effect of inhaled cannabis on spasticity among patients receiving insufficient relief from traditional treatments."

Source:

Corey-Bloom, Jody; Wolfson, Tanya; Gamst, Anthony; Jin, Shelia; Marcotte, Thomas D.; Bentley, Heather; and Gouaux, Ben, "Smoked cannabis for spasticity in multiple sclerosis: a randomized, placebo-controlled trial," Canadian Medical Association Journal (Ottawa, Ontario: May 14, 2012), pp. 6-7.

<http://www.cmaj.ca/content/early/2012/05/14/cmaj.110837.full.pdf>

78.

(medical cannabis - pain) "By providing a medical geographic patient utilization "snapshot" of 236.4 patient-years of the use of MC at a regional pain clinic, this study provides further insight into the applicability of cannabinoid botanicals in the management of a broad range of refractory chronic pain conditions in adults, from myofascial pain and discogenic back pain to neuropathic pain and central pain syndromes. With physicians employing proper chart documentation of appropriate use, efficacy, and side effects at patient visits, in a manner similar to that used in opioid management of pain, there will hopefully be additional reports in the future on MC use in pain management to add to the clinical database."

"Such a literature can grow only if certain stereotypes and myths about MC use are dispelled amongst pain management specialists and their regulators. The results presented here should help to deconstruct mythologies about the kinds of patients accessing MC treatment, including their young age or their propensity to malingering or feign disease. One prominent mythology is that patients who receive treatment with MC are not "truly sick."⁴⁵ An examination of the chart review data, which includes both subjective and objective diagnostic data substantiating patients' chronic pain illnesses, helps to deflate this concern."

Source:

Aggarwal, Sunil K.; Carter, Gregory T.; Sullivan, Mark D.; ZumBrunnen, Craig; Morrill, Richard; and Mayer, Jonathan D., "Characteristics of patients with chronic pain accessing treatment with medical cannabis in Washington State," *Journal of Opioid Management*, (Weston, Massachusetts: September/October 2009), Vol. 5, p. 264.

http://cannabinegy.com/wp-content/uploads/2011/06/JOM_5-5-05.pdf

http://students.washington.edu/sunila/JOM_5-5-05.pdf

79.

(medical cannabis - neuropathic pain and HIV) "In this randomized clinical trial, smoked cannabis at maximum tolerable dose (1–8% THC), significantly reduced neuropathic pain intensity in HIV-associated DSPN compared to placebo, when added to stable concomitant analgesics. Using verbal descriptors of pain magnitude from DDS, cannabis was associated with an average reduction of pain intensity from 'strong' to 'mild to moderate'. Also, cannabis was associated with a sizeable (46%) and significantly greater (vs 18% for placebo) proportion of patients who achieved what is generally considered clinically meaningful pain relief (eg X30% reduction in pain; Farrar et al, 2001). Mood disturbance, physical disability, and quality of life all improved significantly for subjects during study treatments, regardless of treatment order."

Source:

Ellis, Ronald J; Toperoff, Will; Vaida, Florin; van den Brande, Geoffrey; Gonzales, James; Gouaux, Ben; Bentley, Heather; and Atkinson, J. Hampton, "Smoked Medicinal Cannabis for Neuropathic Pain in HIV: A Randomized, Crossover Clinical Trial," *Neuropsychopharmacology* (Nashville, TN : American College of Neuropsychopharmacology, 2009), Vol. 34, p. 678.

<http://www.nature.com/npp/journal/v34/n3/pdf/npp2008120a.pdf>

80.

(medical cannabis - neuropathic pain) "We found that 25 mg herbal cannabis with 9.4% tetrahydrocannabinol, administered as a single smoked inhalation three times daily for five days, significantly reduced average pain intensity compared with a 0% tetrahydrocannabinol cannabis placebo in adult participants with chronic post-traumatic or postsurgical neuropathic pain. We found significant improvements in measures of sleep quality and anxiety. We have shown the feasibility of a single-dose delivery method for smoked cannabis, and that blinding participants to treatment allocation is possible using this method."

Source:

Ware, Mark A.; Wang, Tongtong; Shapiro, Stan; Robinson, Ann; Ducruet, Thierry; Huynh,Thao; Gamsa, Ann; Bennett, Gary J.; and Collet, Jean-Paul, "Smoked cannabis for chronic neuropathic pain: a randomized controlled trial" (Ottawa, ON: Canadian Medical Association, October 5, 2010), p. E697-E700.

<http://www.cmaj.ca/cgi/reprint/182/14/E694.pdf>

81.

(medical cannabis - PTSD) "A chart review of patients diagnosed with PTSD who were referred to a private psychiatric clinic suggests that the synthetic cannabinoid, nabilone, has beneficial effects beyond its official indication in regard to abolishing or greatly reducing nightmares that persisted in spite of treatment with conventional PTSD medications.

"The subjects concomitantly received nabilone in addition to the one or more psychiatric medications that they were already taking for 2 years or more. No tolerance to nabilone was observed among the patients. This may indicate its potential longer-term safety and efficacy.

"... on the basis of these retrospective findings, nabilone appears to be a significant treatment for nightmares in the PTSD population."

Source:

Fraser, George A., "The Use of a Synthetic Cannabinoid in the Management of Treatment-Resistant Nightmares in Posttraumatic Stress Disorder (PTSD)," *CNS Neuroscience & Therapeutics* (Hoboken, NJ: Wiley-Blackwell, Winter 2009), p. 87.

<http://onlinelibrary.wiley.com/doi/10.1111/j.1755-5949.2008.00071.x/pdf>

82.

(medical cannabis - substance abuse treatment) "It is clear, however, that cannabis use did not compromise substance abuse treatment amongst the medical marijuana using group. In fact, medical marijuana users seemed to fare equal to or better than non-medical marijuana users in every important outcome category. Movement from more harmful to less harmful drugs is an improvement worthy of consideration by treatment providers and policymakers. The economic cost of alcohol use in California has been estimated at \$38 billion [30]. Add to this the harm to individuals, families, communities, and society from methamphetamine, heroin, and cocaine, and a justification can be made for medical marijuana in addictions treatment as a harm reduction practice. As long as marijuana use is not associated with poorer outcomes, then replacing other drug use with marijuana may lead to social and economic savings."

Source:

Swartz, Ronald, "Medical marijuana users in substance abuse treatment," Harm Reduction Journal (London, United Kingdom: March 2010) Vol. 7, p. 7-8.

<http://www.harmreductionjournal.com/content/pdf/1477-7517-7-3.pdf>

83.

(medical cannabis - substance abuse treatment) "The current study has revealed unique properties of the phytocannabinoid CBD and underscores the contrasting characteristics of the main constituents of cannabis in relation to addiction vulnerability. Compared with the documented effects of THC to enhance heroin self-administration (Solinas et al., 2004; Ellgren et al., 2007), the present data demonstrated that CBD specifically inhibited reinstatement of cue-induced heroin seeking. The specificity of CBD to cue-induced reinstatement was also emphasized by the observation that the compound still inhibited drug relapse behavior in animals extinguished to the environmental context (self-administration chamber) previously associated with heroin. The results are striking given the very selective and protracted effects of CBD."

"Overall, the observations of this study suggest the potential for CBD as a treatment strategy given its specificity to attenuate cue-induced drug-seeking behavior, preferential impact on mesolimbic neuronal populations, and enduring neural actions. Clearly, greater attention needs be given to the potential role of CBD in the treatment of addiction and other mental health disorders. Clearly, greater attention needs be given to the potential role of CBD in the treatment of addiction and other mental health disorders.

Source:

Ren, Yanhua; Whittard, John; Higuera-Matas, Alejandro; Morris, Claudia V.; and Yasmin L. Hurd, "Cannabidiol, a Nonpsychotropic Component of Cannabis, Inhibits Cue-Induced Heroin Seeking and Normalizes Discrete Mesolimbic Neuronal Disturbances," The Journal of Neuroscience (Washington, DC: Society for Neuroscience, November 25, 2009), Vol. 29, No. 47, pp. 14767 and 14768.

<http://www.jneurosci.org/cgi/reprint/29/47/14764.pdf>

84.

(medical cannabis - treatment for schizophrenia and psychosis) "... a preliminary report from a 4-week, double-blind controlled clinical trial, using an adequate number of patients and comparing the effects of CBD with amisulpride in acute schizophrenic and schizophreniform psychosis, showed that CBD significantly reduced acute psychotic symptoms after 2 and 4 weeks of treatment when compared to baseline. In this trial CBD did not differ from amisulpride except for a lower incidence of side effects (49).

"In conclusion, results from pre-clinical and clinical studies suggest that CBD is an effective, safe and well-tolerated alternative treatment for schizophrenic patients."

Source:

"Zuardi, A.W.; Crippa, J.A.S.; Hallak, J.E.C.; Moreira, F.A.; and Guimarães, F.S., "Cannabidiol, a Cannabis sativa constituent, as an antipsychotic drug," Brazilian Journal of Medical and Biological Research (Ribeirão Preto, Brazil: April 2006), Volume 39, Issue 4, p. 427-428.

<http://www.scielo.br/pdf/bjmb/v39n4/6164.pdf>

85.

(medical marijuana - schizophrenia) "Our results provide evidence that the non-cannabimimetic constituent of marijuana, cannabidiol, exerts clinically relevant antipsychotic effects that are associated with marked tolerability and safety, when compared with current medications."

Source:

Leweke, FM; Piomelli, D; Pahlisch, F; Muhl, D; Gerth, CW; Hoyer, C; Klosterkotter, J; Hellmich, M; and Koethe, D, "Cannabidiol enhances anandamide signaling and alleviates psychotic symptoms of schizophrenia," Translational Psychiatry (New York, NY: Nature Publishing Company, March 2012), p. 6.

<http://www.nature.com/tp/journal/v2/n3/pdf/tp201215a.pdf>

86.

(medical cannabis - skin cancer) "The present data indicate that local cannabinoid administration may constitute an alternative therapeutic approach for the treatment of nonmelanoma skin cancer. Of further therapeutic interest, we show that skin cells express functional CB2 receptors. The synergy between CB1 and CB2 receptors in eliciting skin tumor cell apoptosis reported here is nonetheless intriguing because it is not observed in the case of cannabinoid-induced glioma cell apoptosis (21, 22). In any event, the present report, together with the implication of CB2- or CB2-like receptors in the control of peripheral pain (40–42) and inflammation (41), opens the attractive possibility of finding cannabinoidbased therapeutic strategies for diseases of the skin and other tissues devoid of undesired CB1-mediated psychotropic side effects."

Source:

Casanova, M. Llanos; Blázquez, Cristina; Martínez-Palacio, Jesús; Villanueva, Concepción; Fernández-Aceñero, Jesús; Huffman, John W.; Jorcano, José L.; and Guzmán, Manuel, "Inhibition of skin tumor growth and angiogenesis in vivo by activation of cannabinoid receptors," Journal of Clinical Investigation (Ann Arbor, MI: American Society for Clinical Investigation, January 2003), p. 49.

<http://www.jci.org/articles/view/16116/version/1/files/pdf?disposition=a...>

87.

(medical cannabis - drug substitution) "Eighty five percent of the BPG [Berkeley Patients Group] sample reported that cannabis has much less adverse side effects than their prescription medications. Additionally, the top two reasons listed by participants as reasons for substituting cannabis for one of the substances previously mentioned were less adverse side effects from cannabis (65%) and better symptom management from cannabis (57.4%)."

"Conclusion

"The substitution of one psychoactive substance for another with the goal of reducing negative outcomes can be included within the framework of harm reduction. Medical cannabis patients have been engaging in substitution by using cannabis as an alternative to alcohol, prescription and illicit drugs."

Source:

Reiman, Amanda, "Cannabis as a Substitute for Alcohol and Other Drugs," Harm Reduction Journal (London, United Kingdom: December 2009).

<http://www.harmreductionjournal.com/content/pdf/1477-7517-6-35.pdf>

88.

(medical cannabis - vaporization) "The use of a vaporizing device may mitigate some of these symptoms. Cannabis vaporization is a technique aimed at suppressing the formation of irritating respiratory toxins by heating cannabis to a temperature where active cannabinoids are volatilized, but below the point of combustion where smoke and associated toxins form. The use of a vaporizer is associated with higher plasma THC concentrations than smoking marijuana cigarettes, little if any carbon monoxide production, and significantly fewer triggered respiratory symptoms."

Source:

American Medical Association, Council on Science and Public Health, "Report 3 of the Council on Science and Public Health: Use of Cannabis for Medicinal Purposes" (December 2009), p. 15.

http://americansforsafeaccess.org/downloads/AMA_Report.pdf

89.

(medical cannabis - vaporization) "These results suggest that the respiratory effects of cannabis can decrease with the use of a vaporizer. The data reveal that respiratory symptoms like cough, phlegm, and tightness in the chest increase with cigarette use and cannabis use, but are less severe among users of a vaporizer."

Source:

Earleywine, Mitch and Barnwell, Sara Smucker, "Decreased respiratory symptoms in cannabis users who vaporize," Harm Reduction Journal (London, United Kingdom: April 16, 2007) Vol. 4, Article 11, p. 2.

<http://www.harmreductionjournal.com/content/pdf/1477-7517-4-11.pdf>

90.

(medical cannabis - therapeutic uses of cannabinoids) "Recent developments suggest that non-psychoactive phytocannabinoids exert a wide range of pharmacological effects (Figure 1), many of which are of potential therapeutic interest. The most studied among these compounds is CBD, the pharmacological effects of which might be explained, at least in part, by a combination of mechanisms of action (Table 1, Figure 1). CBD has an extremely safe profile in humans, and it has been clinically evaluated (albeit in a preliminary fashion) for the treatment of anxiety, psychosis, and movement disorders. There is good pre-clinical evidence to warrant clinical studies into its use for the treatment of diabetes, ischemia and cancer ... CBD is more effective or has fewer unwanted effects than other medicines. A sublingual spray that is a standardized *Cannabis* extract containing approximately equal quantities of CBD and D9-THC (Sativex[®]), has been shown to be effective in treating neuropathic pain in multiple sclerosis patients [76].

"The pharmacology of D9-THCV (i.e. CB1 antagonism associated with CB2 agonist effects) is also intriguing because it has the potential of application in diseases such as chronic liver disease or obesity—when it is associated with inflammation—in which CB1 blockade together with some CB2 activation is beneficial.

"The plant *Cannabis* is a source of several other neglected phytocannabinoids such as CBC and CBG. Although the spectrum of pharmacological effects of these compounds is largely unexplored, their potent action at TRPA1 and TRPM8 might make these compounds new and attractive tools for pain management."

Source:

Izzo, Angelo A.; Borrelli, Francesca; Capasso, Raffaele; Di Marzo, Vincenzo; and Mechoulam, Raphael, "Non-psychoactive plant cannabinoids: new therapeutic opportunities from an ancient herb," Trends in Pharmacological Sciences (London, United Kingdom: October 2009) Vol. 30, Issue 10, pp. 525-526.

<http://www.ncbi.nlm.nih.gov/pubmed/19729208>

<http://cannabisinternational.org/info/Non-Psychoactive-Cannabinoids.pdf>

91. **Institute of Medicine - Marijuana and Medicine: Assessing the Science Base - 1999**

(medical cannabis - IOM Report - general conclusions) "At this point, our knowledge about the biology of marijuana and cannabinoids allows us to make some general conclusions:

- Cannabinoids likely have a natural role in pain modulation, control of movement, and memory.
- The natural role of cannabinoids in immune systems is likely multi-faceted and remains unclear.
- The brain develops tolerance to cannabinoids.
- Animal research demonstrates the potential for dependence, but this potential is observed under a narrower range of conditions than with benzodiazepines, opiates, cocaine, or nicotine.
- Withdrawal symptoms can be observed in animals but appear to be mild compared to opiates or benzodiazepines, such as diazepam (Valium)."

Source:

Janet E. Joy, Stanley J. Watson, Jr., and John A Benson, Jr., "Marijuana and Medicine: Assessing the Science Base," Division of Neuroscience and Behavioral Research, Institute of Medicine (Washington, DC: National Academy Press, 1999), p. 3.

http://books.nap.edu/openbook.php?record_id=6376&page=3

92.

(medical cannabis - IOM Report - immunosuppression) The Institute of Medicine's 1999 report on medical marijuana examined the question of whether marijuana could diminish patients' immune system - an important question when considering marijuana use by AIDS and cancer patients. The report concluded that, "the short-term immunosuppressive effects are not well established but, if they exist, are not likely great enough to preclude a legitimate medical use."

Source:

Janet E. Joy, Stanley J. Watson, Jr., and John A Benson, Jr., "Marijuana and Medicine: Assessing the Science Base," Division of Neuroscience and Behavioral Research, Institute of Medicine (Washington, DC: National Academy Press, 1999), p. 5.

<http://books.nap.edu/openbook.php?isbn=0309071550&page=5>

93.

(medical cannabis - IOM Report - therapeutic value) The Institute of Medicine's 1999 report on medical marijuana stated, "The accumulated data indicate a potential therapeutic value for cannabinoid drugs, particularly for symptoms such as pain relief, control of nausea and vomiting, and appetite stimulation."

Source:

Janet E. Joy, Stanley J. Watson, Jr., and John A. Benson, Jr., "Marijuana and Medicine: Assessing the Science Base," Division of Neuroscience and Behavioral Research, Institute of Medicine (Washington, DC: National Academy Press, 1999).

http://books.nap.edu/openbook.php?record_id=6376&page=4

94.

(medical cannabis - IOM Report - tolerance) In the Institute of Medicine's report on medical marijuana, the researchers examined the physiological risks of using marijuana and cautioned, "Marijuana is not a completely benign substance. It is a powerful drug with a variety of effects. However, except for the harms associated with smoking, the adverse effects of marijuana use are within the range of effects tolerated for other medications."

Source:

Janet E. Joy, Stanley J. Watson, Jr., and John A. Benson, Jr., "Marijuana and Medicine: Assessing the Science Base," Division of Neuroscience and Behavioral Research, Institute of Medicine (Washington, DC: National Academy Press, 1999), p. 126-127.

http://books.nap.edu/openbook.php?record_id=6376&page=126

95.

(medical cannabis - IOM Report - increased use) The Institute of Medicine's 1999 report on medical marijuana examined the question whether the medical use of marijuana would lead to an increase of marijuana use in the general population and concluded that, "At this point there are no convincing data to support this concern. The existing data are consistent with the idea that this would not be a problem if the medical use of marijuana were as closely regulated as other medications with abuse potential." The report also noted that, "this question is beyond the issues normally considered for medical uses of drugs, and should not be a factor in evaluating the therapeutic potential of marijuana or cannabinoids."

Source:

Janet E. Joy, Stanley J. Watson, Jr., and John A Benson, Jr., "Marijuana and Medicine: Assessing the Science Base," Division of Neuroscience and Behavioral Research, Institute of Medicine (Washington, DC: National Academy Press, 1999). p. 99.

http://books.nap.edu/openbook.php?record_id=6376&page=99

96.

(medical cannabis - IOM Report - uses of cannabinoid drugs) "Advances in cannabinoid science of the past 16 years have given rise to a wealth of new opportunities for the development of medically useful cannabinoid-based drugs. The accumulated data suggest a variety of indications, particularly for pain relief, antiemesis, and appetite stimulation. For patients such as those with AIDS or who are undergoing chemotherapy, and who suffer simultaneously from severe pain, nausea, and appetite loss, cannabinoid drugs might offer broad-spectrum relief not found in any other single medication."

Source:

Janet E. Joy, Stanley J. Watson, Jr., and John A Benson, Jr., "Marijuana and Medicine: Assessing the Science Base," Division of Neuroscience and Behavioral Research, Institute of Medicine (Washington, DC: National Academy Press, 1999), p. 177.

http://books.nap.edu/openbook.php?record_id=6376&page=177

97.

(medical cannabis - IOM Report - movement disorders) "The abundance of CB1 receptors in basal ganglia and reports of animal studies showing the involvement of cannabinoids in the control of movement suggest that cannabinoids would be useful in treating movement disorders in humans. Marijuana or CB1 receptor agonists might provide symptomatic relief of chorea, dystonia, some aspects of parkinsonism, and tics."

Source:

Janet E. Joy, Stanley J. Watson, Jr., and John A Benson, Jr., "Marijuana and Medicine: Assessing the Science Base," Division of Neuroscience and Behavioral Research, Institute of Medicine (Washington, DC: National Academy Press, 1999), p. 169.

http://books.nap.edu/openbook.php?record_id=6376&page=169

98.

(medical cannabis - IOM Report - gateway theory) In March 1999, the Institute of Medicine issued a report on various aspects of marijuana, including the so-called Gateway Theory (the theory that using marijuana leads people to use harder drugs like cocaine and heroin). The IOM stated: "There is no conclusive evidence that the drug effects of marijuana are causally linked to the subsequent abuse of other illicit drugs."

Source:

Janet E. Joy, Stanley J. Watson, Jr., and John A Benson, Jr., "Marijuana and Medicine: Assessing the Science Base," Division of Neuroscience and Behavioral Research, Institute of Medicine (Washington, DC: National Academy Press, 1999), p. 6.

<http://books.nap.edu/openbook.php?isbn=0309071550&page=6>

99.

(*medical cannabis - IOM Report - gateway theory*) The Institute of Medicine's 1999 report on marijuana explained that marijuana has been mistaken for a gateway drug in the past because "Patterns in progression of drug use from adolescence to adulthood are strikingly regular. Because it is the most widely used illicit drug, marijuana is predictably the first illicit drug most people encounter. Not surprisingly, most users of other illicit drugs have used marijuana first. In fact, most drug users begin with alcohol and nicotine before marijuana, usually before they are of legal age."

Source:

Janet E. Joy, Stanley J. Watson, Jr., and John A Benson, Jr., "Marijuana and Medicine: Assessing the Science Base," Division of Neuroscience and Behavioral Research, Institute of Medicine (Washington, DC: National Academy Press, 1999), p. 99.

http://books.nap.edu/openbook.php?record_id=6376&page=99

100.

(*medical cannabis - IOM Report - adverse effects*) "For most people, the primary adverse effect of acute marijuana use is diminished psychomotor performance. It is, therefore, inadvisable to operate any vehicle or potentially dangerous equipment while under the influence of marijuana, THC, or any cannabinoid drug with comparable effects."

Source:

Janet E. Joy, Stanley J. Watson, Jr., and John A Benson, Jr., "Marijuana and Medicine: Assessing the Science Base," Division of Neuroscience and Behavioral Research, Institute of Medicine (Washington, DC: National Academy Press, 1999), p. 125-126.

http://books.nap.edu/openbook.php?record_id=6376&page=125

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