



Vol. 6, Issue 8
September 2014

CANNABINOID CHRONICLES

Medical Cannabis News and Information

Terpenes & Terpenoids

Have you ever experienced a strain of cannabis that smells amazing but has little potency? The two qualities are not related since cannabinoids are odourless. When consumed as whole-plant medicine, the smell and taste comes primarily from a family of phytochemicals (chemical compounds from plants) called terpenes.

Terpenes are a large and varied class of organic compounds produced by a variety of plants (e.g. conifers) and the odd insect. Chemically they are hydrocarbons, resulting from the combination of multiples of the C_5H_8 molecule, aka isoprene. When they are modified chemically, such as by oxidation or rearrangement of the carbon skeleton, the resulting compounds are generally referred to as **terpenoids**.

Terpenes and terpenoids are sometimes used interchangeably, but there is a chemical distinction.

Terpenes have been found to be essential building blocks of complex plant hormones and molecules, pigments, sterols and cannabinoids in cannabis.

Terpenes also play an important role by providing the plant with natural protection from bacteria and fungus, insects, and other environmental stresses.

Terpenes and terpenoids are often strong-smelling and are the primary constituents of the **essential oils** of many types of plants and flowers; a large percentage of the essential oil found in cannabis is comprised of terpenes. Since terpenes are found in other plants, research has not been restricted. As a result, various terpenes created by cannabis have been found to have beneficial biological effects; they do not, however, contribute to the psychological activity of cannabis.

Terpenes are lipophilic and permeate membranes;

many cross the blood-brain barrier (BBB) after inhalation. Inhaled terpenes may modulate THC activity and cause sedation.

Myrcene is the most abundant terpene. Found mainly in sativas, myrcene possesses muscle-relaxing, anti-depressant, anti-inflammatory, and analgesic effects among other benefits. Myrcene also has an effect on the permeability of cell membranes such as the BBB, which allows for the absorption of more cannabinoids by brain cells.

Another relatively abundant terpene **beta-caryophyllene** is responsible for activating the CB2 receptor and acts as a non-psychoactive anti-inflammatory. Because it binds to a cannabinoid receptor, beta-caryophyllene is considered a cannabinoid. The terpene is in many legal herbs and spices. It is also a US FDA approved food additive, making it the first dietary cannabinoid.

Limonene, with a strong citrus odour, is a terpene with a strong anti-depressant effect due to its suppression of stress hormone production, and, like THC, works against cancer. Limonene is thought to quickly penetrate cell membranes

Continued page 4...



International Association for Cannabinoid Medicines (IACM) Bulletin

Only small increased risk for schizophrenia by cannabis use

In a large study with 5456 individuals with an initial diagnosis of schizophrenia cannabis use was associated with a small increase of risk for the disease by a factor of 1.6 after controlling for other risk factors. The use of stimulants and cocaine was also associated with a small increase in risk.

Source: <http://www.ncbi.nlm.nih.gov/pubmed/24990397>

Cannabis use had no major negative effects on patients with schizophrenia

In a study with 110 patients with schizophrenia “there was no evidence of a specific association between cannabis use and positive symptoms, or negative symptoms, relapse or hospital admissions. However, a greater dose of cannabis was associated with subsequent higher depression and anxiety.”

Source: <http://www.ncbi.nlm.nih.gov/pubmed/25011381>

Low levels of anandamide are associated with increased susceptibility to stress

Animal studies with mice indicate that the brain levels of the endocannabinoid anandamide predict acute stress-induced anxiety. Authors concluded that these studies “provide further support that eCB-augmentation is a viable pharmacological strategy for the treatment of stress-related neuropsychiatric disorders.”

Source: <http://www.ncbi.nlm.nih.gov/pubmed/25004388>

Cannabis legalization did not increase use of the drug by adolescents

A rise of cannabis use among teenagers over the past 20 years has no significant tie to the legalization of cannabis for medical use in many states, according to a new research paper. Comparing surveys of cannabis use by adolescents conducted annually by the federal Centers for Disease Control and Prevention, researchers found the probability that a high schooler had used cannabis in the last 30 days was no more than 0.8 percent higher in states with medical cannabis laws compared to states that had not approved medical cannabis.

Source: www.reuters.com/article/2014/07/29/us-usa-marijuana-teens-idUSKBN0FYIEG20140729

Cannabis use does not influence adherence to HIV treatment

In a large study regular cannabis use was not associated with adherence to antiretroviral therapy (ART) of HIV positive patients. Authors concluded that “these findings suggest cannabis may be utilized by PLWHA for medicinal and recreational purposes without compromising effective adherence to ART.”

Source: <http://www.ncbi.nlm.nih.gov/pubmed/25012624>

THC safe for therapeutic use in older persons

THC appeared to be safe and well tolerated by healthy older individuals. This is the result of a placebo controlled study by researchers of several hospitals in the Netherlands. They evaluated the safety and pharmacokinetics of three oral doses of Namisol, a novel THC preparation in tablet form, in older subjects. Twelve healthy older subjects with a mean age of 72 years randomly received a single oral dose of 3mg, 5mg, or 6.5mg of THC or matching placebo, in a crossover manner, on each intervention day.

THC was safe and well tolerated. The most frequently reported adverse events were drowsiness (27%) and dry mouth (11%). There was a wide inter-individual variability in plasma concentrations of THC. Overall, the pharmacological effects of THC were smaller than effects previously reported in young adults. Authors wrote that “Data on safety and effectiveness of THC in frail older persons are urgently required, as this population could benefit from the therapeutic applications of THC.”

Source: <http://www.ncbi.nlm.nih.gov/pubmed/25035121>

CBD and CBDV activate vanilloid receptors

The non-psychotropic plant cannabinoids, cannabidivarin (CBDV) and cannabidiol (CBD), activate vanilloid receptors (TRPV1) in cell experiments. Researchers propose a “potential for the treatment of neuronal hyperexcitability”, such as epilepsy.

Source: <http://www.ncbi.nlm.nih.gov/pubmed/25029033>

Certain variants of the CB1 receptor are associated with impulsivity

In 323 adolescents certain variants of the gene, which encodes the CB1 receptor “may play a role in determining adolescent impulsive behavior.”

Source: <http://www.ncbi.nlm.nih.gov/pubmed/24980155>

CBD reduces production of sebum in the skin

Research with cells, which produce cutaneous sebum (sebocytes), shows that cannabidiol (CBD) exerts anti-inflammatory effects on human sebocytes and reduces sebum production.

Source: <http://www.ncbi.nlm.nih.gov/pubmed/25061872>

Synthetic cannabinoid associated with kidney injury

In several cases, smoking synthetic cannabinoids was associated with acute kidney injury. Portland, USA.

Source: <http://www.ncbi.nlm.nih.gov/pubmed/25089722>

For more info visit: www.cannabis-med.org/

Physician Responds to CMA

Out-going Canadian Medical Association (CMA) president, Dr. Louis Hugo Francescutti, has commented on the new medical cannabis regulations (MMPR) and says that a largely unproven treatment is now being thrust upon doctors. Francescutti acknowledged that lack of funding may be part of the reason for lack of research on the effectiveness of cannabis but said the industry as it stands now has "got nothing to do with medicinal properties. It's got everything to do with people wanting to smoke dope."

Dr. Murray Dease from Saskatoon responds:

Re: Welcome to 'legalized dope-pushing' (SP, July 24). With respect, I must disagree with Dr. Louis Hugo Francescutti, president of the Canadian Medical Association (CMA), regarding medical marijuana. His comments in the cited article are misinformed and misleading. After I recently reviewed the medical literature on cannabis for a presentation to my colleagues, I can attest that there are, in fact, hundreds of studies that show the benefits of cannabis in treating conditions as varied as cancer and the effects of chemotherapy, chronic pain, HIV, multiple sclerosis, intractable epilepsy, Alzheimer's disease, and many others.

Studies at our own University of Saskatchewan have shown cannabis-like drugs promote nerve regeneration in the brain, and may have anxiety-reducing and anti-depressant effects.

Investigations into the effects of cannabis date back to the Indian Hemp Commission study of 1893 and the Laguardia Committee Report of 1944. These studies, as well as reports from the British Wooten Committee, the Canadian Le Dain Commission, the Dutch Baan Commission, the Commission of the Australian Government, and the U.S. National Academy of Sciences in the '60s and '70s all came to the general

conclusion that the dangers of cannabis had been greatly exaggerated, and that the drug might provide legitimate medical benefit.

Few studies were done in the following decades to investigate the possible benefits of the drug. However, this is starting to change, and the results of current cannabis research are surprising.

The chief medical correspondent for CNN, Dr. Sanjay Gupta, recently reviewed the medical literature and concluded: "Cannabis does not have a high potential for abuse, has very legitimate medical applications and is sometimes the only thing that works. Regarding marijuana, we have been terribly and systematically misled for nearly 70 years."

I agree with Dr. Francescutti in his implication that marijuana is not "magical." It is also not harmless. Marijuana is a drug, and it must be respected. Like any drug, its potential benefits come with risks, some of them very troubling. We also must remember that all prescription medications prescribed by doctors today have risks.

For example, an article in The American Journal of Medicine states that approximately 107,000 patients are hospitalized annually for gastrointestinal complications related to non-steroidal anti-inflammatory (NSAID) drugs such as naproxen and ibuprofen, and at least 16,500 NSAID-related deaths occur each year among arthritis patients alone. Yet NSAIDs are widely available over the counter. The recreational drugs that are sanctioned by our society also have major risks. The U.S. Centres for Disease Control states that "excessive alcohol consumption is the third leading preventable cause of death in the United States and is associated with multiple adverse health consequences, including liver cirrhosis, various cancers, unintentional injuries, and violence. In 2001, excessive alcohol use was responsible for approximately 75,000 preventable deaths in the United States."

To expect cannabis to have no potential adverse effects is an unreasonable standard.

I am disappointed by how Dr. Francescutti flippantly dismissed the possible benefits of cannabis with comments about "legalized dope pushing" and munchies. Cannabis has been used by millions of people with far fewer ill effects than many legal drugs, both prescription and recreational.

Cannabis has been shown in good scientific studies to provide benefit. Many of the therapies, medications and procedures we benefit from today were ridiculed when they were first introduced. If science teaches us anything, it is that we need to keep an open mind.

Sources: www.thestarphoenix.com/health/Welcome+legalized+dope+pushing/10057953/ AND www.thestarphoenix.com/technology/Cannabis+beneficial/10078152/story.html



"You have a lot of very boring health issues, so I'm prescribing medical marijuana for myself."

Restrictions on Medical Cannabis Are Unconstitutional

On Aug 15, B.C.'s highest court ruled that there is a constitutional right to cannabis-infused cookies and other cannabis products such as infused oils, balms and lotions. In a 2-1 judgment, the provincial Court of Appeal said Canada's medical cannabis legislation is unconstitutional because it restricts patients to possessing only dried cannabis and consuming it via smoking. The top bench suspended its ruling to give Ottawa a year to amend the law to allow patients access to edibles and other non-smoking by-products.

The majority dismissed the government's appeal of a Victoria case in which a compassion club baker, Owen Smith, was found not guilty after being caught with 200-plus cookies, a supply of cannabis-infused cooking oils and some dried cannabis in his apartment.

In 2012, B.C. Supreme Court Judge Robert Johnston acquitted Smith after ruling that permitting dried cannabis alone was arbitrary and did little to further a legitimate state interest.

Sources: www.vancouver.sun.com/news/metro/Mulgrew+court+says+restrictions+medical+marijuana/10118643/story.html

Visit our website at www.thevics.com



SACRED HERB

Glass / Vapes / Bongos
Chaos & Culture

Paul Reid Dan Brown

106-561 Johnson St Victoria BC V8W 1M2
250-384-0659 www.sacredherb.com

Terpenes & Terpenoids Cont'd

Continued from page 1: causing other terpenes to be absorbed more rapidly and effectively. Because of limonene's potent anti-carcinogenic and anti-fungal properties, it is thought to be the component protecting cannabis smokers from aspergillus fungi and carcinogens found in cannabis smoke.

Linalool, *citronellol* and *a-terpinene* have all been found to have both anti-depressive and sedative effects which may help to mitigate the anxiety that some experience when ingesting THC.

Caryophyllene oxide is the terpene found in all cannabis strains, but rare in other plants, that police dogs are trained to detect.

Alpha-pinene is found in the oils of rosemary and sage as well as many species of pine trees. It can increase mental focus and energy, as well as act as an expectorant, bronchodilator, and a topical antiseptic.

Terpenes and terpenoids are quite potent, and affect animal and even human behaviour when inhaled from ambient air at serum levels in the single digits ng/mL. They display unique therapeutic effects that may contribute meaningfully to the *entourage effects* of whole-plant, cannabis-based medicinal extracts, resulting in *better efficacy and fewer side effects*.

"Terpenes & Terpenoids" Sources:

Dorm, Drake (2013) "*Terpenes May Improve Effectiveness Of Medical Marijuana*." www.medicaljane.com/2013/09/23/terpenes-may-improve-effectiveness-of-medical-marijuana/

Grotenherman, Franjo and Ethan Russo, editors. (2002) *Cannabis and Cannabinoids: Pharmacology, Toxicology and Therapeutic Potential*. Binghamton, NY: The Haworth Press Inc. pp 34, 401-404

Reichard, Zach (2013) "*Terpenes: What Are Terpenoids & What Do These Terpenes Do?*" www.medicaljane.com/2013/04/13/terpenes-terpenoids-what-are-they-what-do-they-do/

Russo, E (2011) "*Taming THC: potential cannabis synergy and phytocannabinoid-terpenoid entourage effects*." www.ncbi.nlm.nih.gov/pmc/articles/PMC3165946/

Werner, Clint (2011). *Marijuana, Gateway to Health*. San Francisco, CA: Dachstar Press. pp. 50-53, 80

<http://en.wikipedia.org/wiki/Terpene>

<http://en.wikipedia.org/wiki/Terpenoid>

RESOURCE DIRECTORY:

AIDS Vancouver Island

3rd Fl- 713 Johnson St, Victoria
250-384-2366

VIPWA

101-1139 Yates Street, Victoria
250-382-7927

The Action Committee of People with Disabilities

948 View Street, Victoria
250-383-4105

MS Society of Canada

1004 North Park Street, Victoria
(250) 388-6496

HepC BC

2642 Quadra Street, Victoria
250- 595-3892

BC Cancer Agency

2410 Lee Ave, Victoria
(250) 519-5500

Canadians for Safe Access

www.safeaccess.ca

John W. Conroy, Q.C.

1-877-852-5110 (toll free)
www.johnconroy.com

Kirk Tousaw, Barrister

604-836-1420
www.tousawlaw.ca

DrugSense

www.drugsense.org

BC Coalition of People

With Disabilities

1-800-663-1278

Health Canada

<http://www.hc-sc.gc.ca/dhp-mps/marihuana/index-eng.php>

Drug Policy Alliance

www.drugpolicy.org

Media Awareness Project

www.mapinc.org

Together Against Poverty Society

302-895 Fort Street, Victoria
250-361-3521

"There can be no keener revelation of a society's soul than the way in which it treats its children"

-- Nelson Mandela