

MARIJUANA IN INJURY LITIGATION: THE NEW ALCOHOL

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A close-up photograph of vibrant green marijuana leaves. The leaves are serrated and have a distinct palmate shape. The word "Marijuana" is written in a large, white, serif font across the center of the image, partially overlapping the leaves. The background is a dense field of similar leaves, creating a textured, natural setting.

Marijuana

EFFECT OF ALCOHOL ON INJURY LITIGATION

- Petraski v. Thedos, 382 Ill.App.3d 22, 320 Ill.Dec. 244, 887 N.E.2d 24 (2008).
- 1ST TRIAL, JUDGE EXCLUDED ALCOHOL TESTIMONY OF PLAINTIFF'S EXPERT RE: DECEDENT'S INTOXICATION \$35,000.000 VERDICT
- APPELLATE COURT RULED ALCOHOL TESTIMONY SHOULD HAVE BEEN ALLOWED
- 2ND TRIAL NG / \$0.00 VERDICT
- APPEALED, REVERSED
- SETTLED FOR SUBSTANTIALLY LESS

EFFECT OF ALCOHOL ON INJURY LITIGATION

- ONE MOTORCYCLE REAR-ENDS SECOND MOTORCYCLE
- PASSENGER ON FIRST MOTORCYCLE INJURED; BAC 160
- DRIVER OF SECOND MOTORCYCLE BAC 202; COCAINE METABOLITES
- 'HOW DO I **KEEP OUT** THE ALCOHOL TEST ON THE INJURED PASSENGER' PLAINTIFF'S ATTORNEY

UBIQUITOUS USE

- most commonly used 'illicit' drug in U.S.
- ~12% of people ≥ 12 yrs old reporting use in the past
 - NEJM 2014 370:2219-27.
- Doubling of prevalence of use in adults from 2001 – 2013
- With 'medical' and now approved recreational use, use and abuse and toxicity will increase.

INSTITUTE OF MEDICINE

- acknowledges potential benefits of marijuana use
 - stimulating appetite, particularly in patients with AIDS and the related wasting syndrome
 - combating chemotherapy-induced nausea and vomiting
 - alleviating severe pain
 - ameliorating some forms of spasticity.

MEDICAL CONDITIONS (proven)

- POLITICALLY DRIVEN – VARY FROM STATE TO STATE
- SYMPTOM V. DISEASE CONDITIONS
 - PAIN, NAUSEA/VOMITING CTX
 - GLAUCOMA
 - APPETITE STIMULATION/WASTING/AIDS-HIV
 - MUSCLE SPASTICITY
 - MULTIPLE SCLEROSIS
 - PARKINSONS ALS ALZHEIMERS
 - CROHN'S

RISING USE IN EPILEPSY -CBD

- Like **cannabidiol**, cannabidivarin has anti-seizure effects that are independent of the endocannabinoid system
- Anti-seizure function may be through:
 - regulation of TRP (transient receptor potential) channels
 - lowering 2-AG (2-arachidonoylglycerol) synthesis through the inhibition of DAGL- α (diacylglycerol lipase alpha).”

NEJM 2015;373:1048-1058

CBD FOR SEIZURES – AVOIDING THC

- Two cannabinoid pharmaceutical products are under study in randomized trials.

1) *Epidiolex* (GW Pharma)

- a purified cannabis extract containing 99% cannabidiol (the constituent believed to have the antiseizure effect) and less than 0.10% tetrahydrocannabinol (the psychoactive component)

2) a synthetic cannabinoid from Insys Pharmaceuticals

DIFFICULT TO KNOW WHAT YOU'RE GETTING!

- “ so you can't be sure what you're getting," he said. "It's a bit like health supplements — a product may say it contains 1000 units of vitamin C but when tested it often has nowhere near this amount in it.”
- "Only double-blind, placebo-controlled, randomized clinical trials in which consistent preparations of one or more cannabinoids are used can provide **reliable information** on safety and efficacy.”

ACUTE EFFECTS OF MARIJUANA NHTSA

- relaxation,
- euphoria,
- relaxed inhibitions,
- Disorientation
- altered time and space/perception lack of concentration
impaired learning and memory
- alterations in thought formation and expression
- drowsiness sedation mood changes and paranoia.

SAFETY – A POLISHED WORD FOR TOXICITY!

- SHORT TERM
 - MEMORY PERCEPTION
 - MOTOR IMPAIRMENTS, DRIVING SKILLS, INJURIES
 - JUDGMENT, RISK TAKING
 - PARANOIA AND PSYCHOSIS – DOSE AND PREDISPOSITION (HIGHER WITH ORAL)
 - CARDIAC TOXICITY – MI, HYPERTENSION
 - ANXIETY, PANIC

SAFETY

- LONG TERM USE
 - DEPENDENCE / ADDICTION > WITHDRAWAL(irritability, sleeping difficulties, dysphoria, craving, and anxiety)
 - ALTERED BRAIN DEVELOPMENT - ADOLESCENTS
 - POOR EDUCATIONAL OUTCOME
 - COGNITIVE IMPAIRMENT – LOWER IQ
 - CHRONIC BRONCHITIS (SMOKERS)
 - LUNG CANCER (?)
 - CHRONIC PSYCHOSIS - PREDISPOSITION

Marijuana arrests are up!

- An estimated 700,993 arrests were made nationwide for marijuana-related offenses in 2014 — up from 693,058 in 2013 — of which 88.42% were for possession. On average, one person was arrested for a marijuana-related offense in the U.S. approximately every 45 seconds (every 51 seconds for possession).
- Substantial decreases with de-criminalization and legalization (medical and/or recreational)

LEGALIZATION BY INGREDIENTS

- **400** or more cannabinoid derivatives in MJ plant
 - only some are psychoactive
 - in some places, there are specialized laws which permit the use of the non-psychoactive cannabinoid, cannabadiol (**CBD – a non-psychoactive cannabinoid**)
 - Used for intractable seizures or epilepsy.

Drug Abuse Handbook, CRC Press, p.190, 1998, Steven B. Karch, editor

COLORADO EXPERIENCES

- NO DOSAGE GUIDANCE
- UNEDUCATED COUNSELORS – CLERKS
- INCREASED POTENCY OF PRODUCT – STRONGER
- ED PSYCHOSIS ADMISSIONS INCREASED
 - DENVER HOTEL DEATH FOLLOWING MJ BROWNIE
 - HOMICIDE
 - 5 SAN FRANCISCO TEENS HOSPITALIZED - BROWNIES
- IMPORTANT PUBLIC HEALTH IMPLICATIONS

MARIJUANA ADVERSE EFFECTS RELEVANT TO DRIVING IMPAIRMENT - NHTSA

- ability to concentrate and maintain attention are decreased during marijuana use
- impairment of hand-eye coordination is dose-related over a wide range of dosages.
- Impairment in retention time and tracking, subjective sleepiness,
- distortion of time and distance, vigilance, and loss of coordination in divided
- attention tasks have been reported.

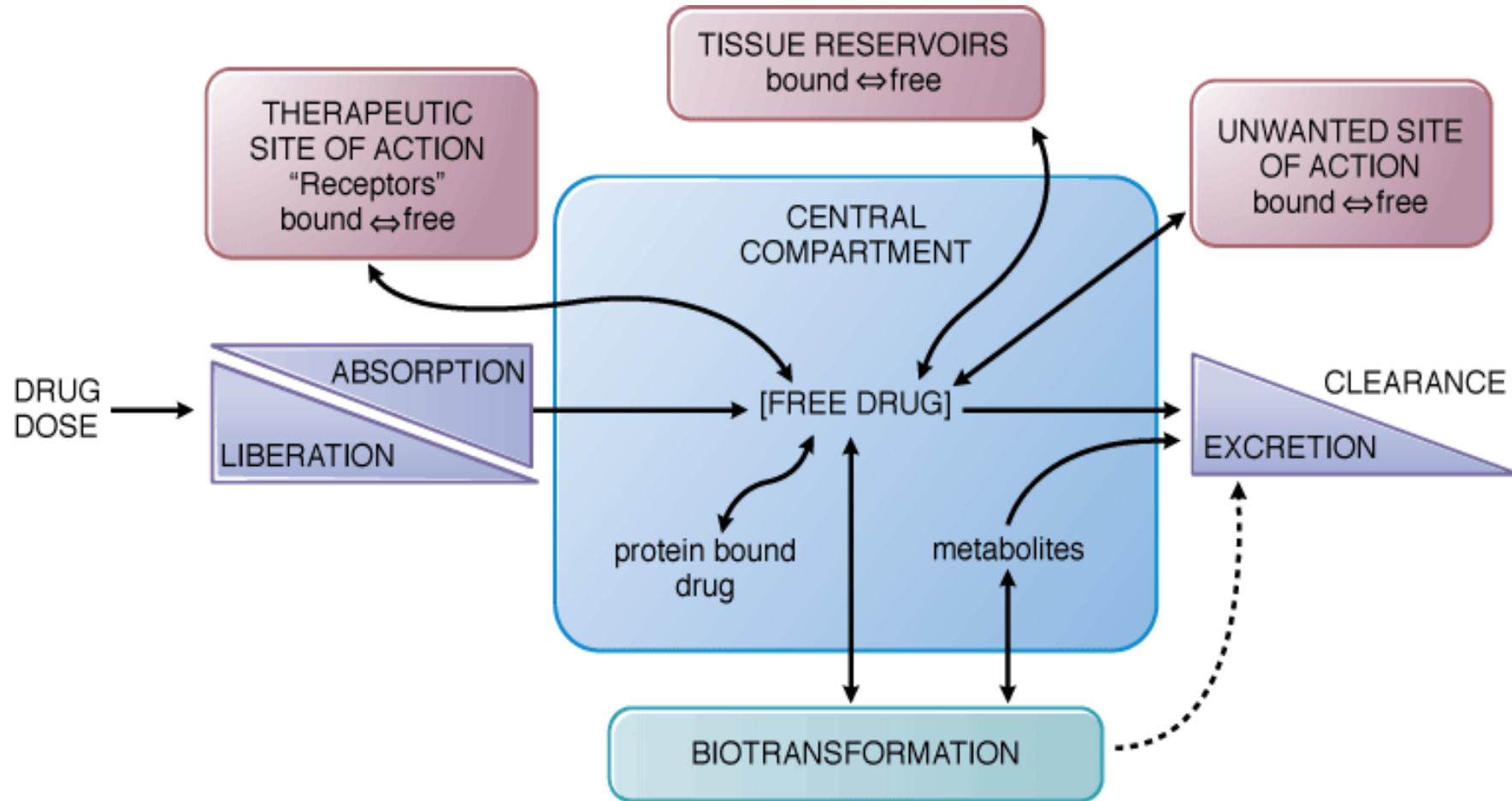
THC NHTSA DEC CRITERIA

- Horizontal gaze nystagmus not present; vertical gaze nystagmus not present;
- lack of convergence present;
- pupil size normal to dilated;
- reaction to light normal to slow;
- pulse rate elevated; blood pressure elevated;
- Body temperature normal to elevated.

Scientific principles applied in marijuana
cases

**MORE COMPLEX THAN
ALCOHOL**

BIG PICTURE ADME



Source: Brunton LL, Chabner BA, Knollmann BC: *Goodman & Gilman's The Pharmacological Basis of Therapeutics, 12th Edition*: www.accessmedicine.com

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ROUTES OF ADMINISTRATION

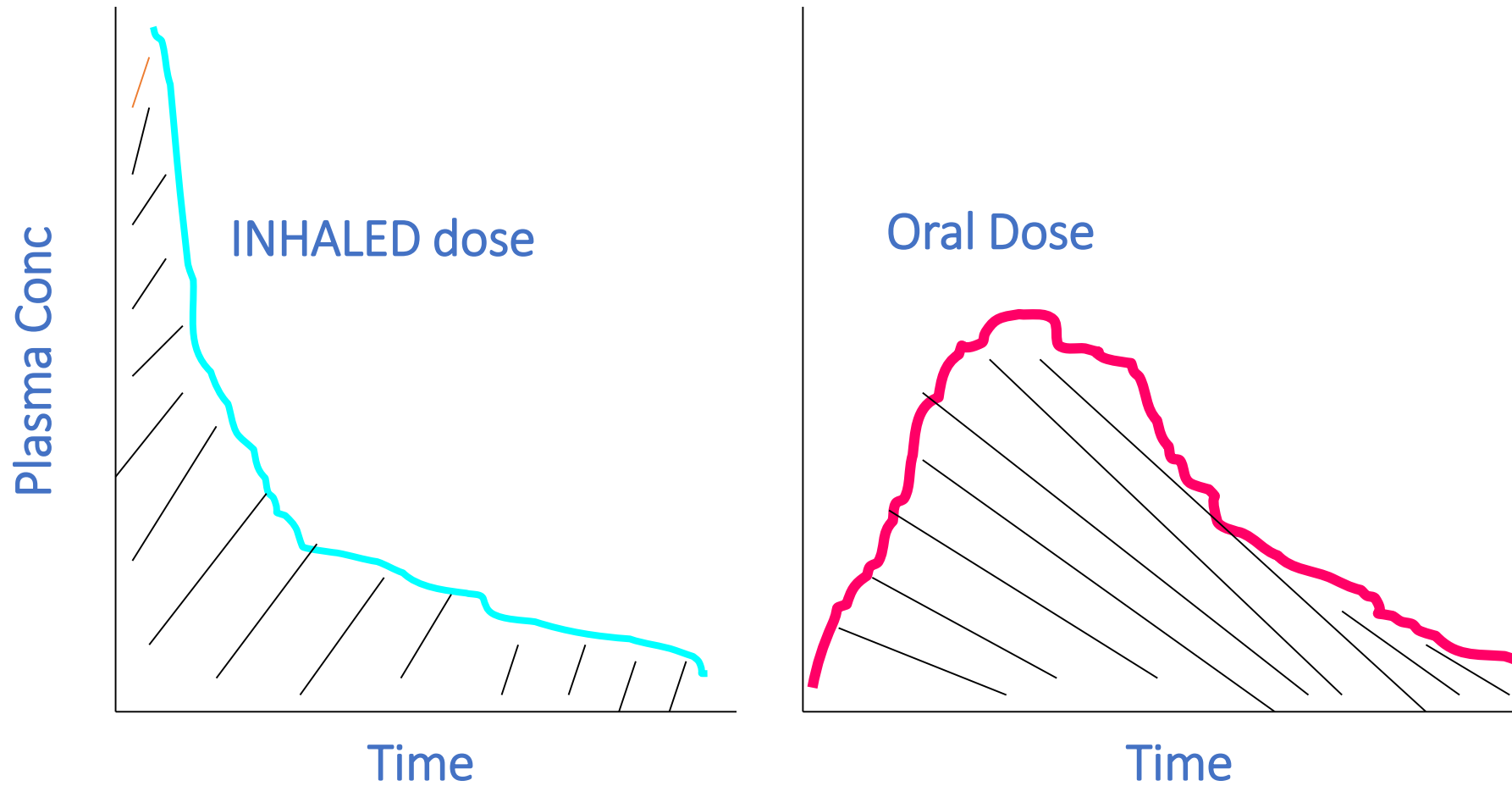
- SMOKING / PYROLYSIS
 - VAPORIZATION
 - SUBLINGUAL / BUCCAL UNDER TONGUE/CHEEK
 - EDIBLE – ORAL BAKED, CANDY, LIQUIDS
-
- ROUTE DETERMINES THE ONSET AND PEAK OF DRUG ACTIONS ALSO DETERMINES THE DOSE! ('HIT', 'DEPTH', 'HIGH')

PHARMACOKINETICS - TIMING

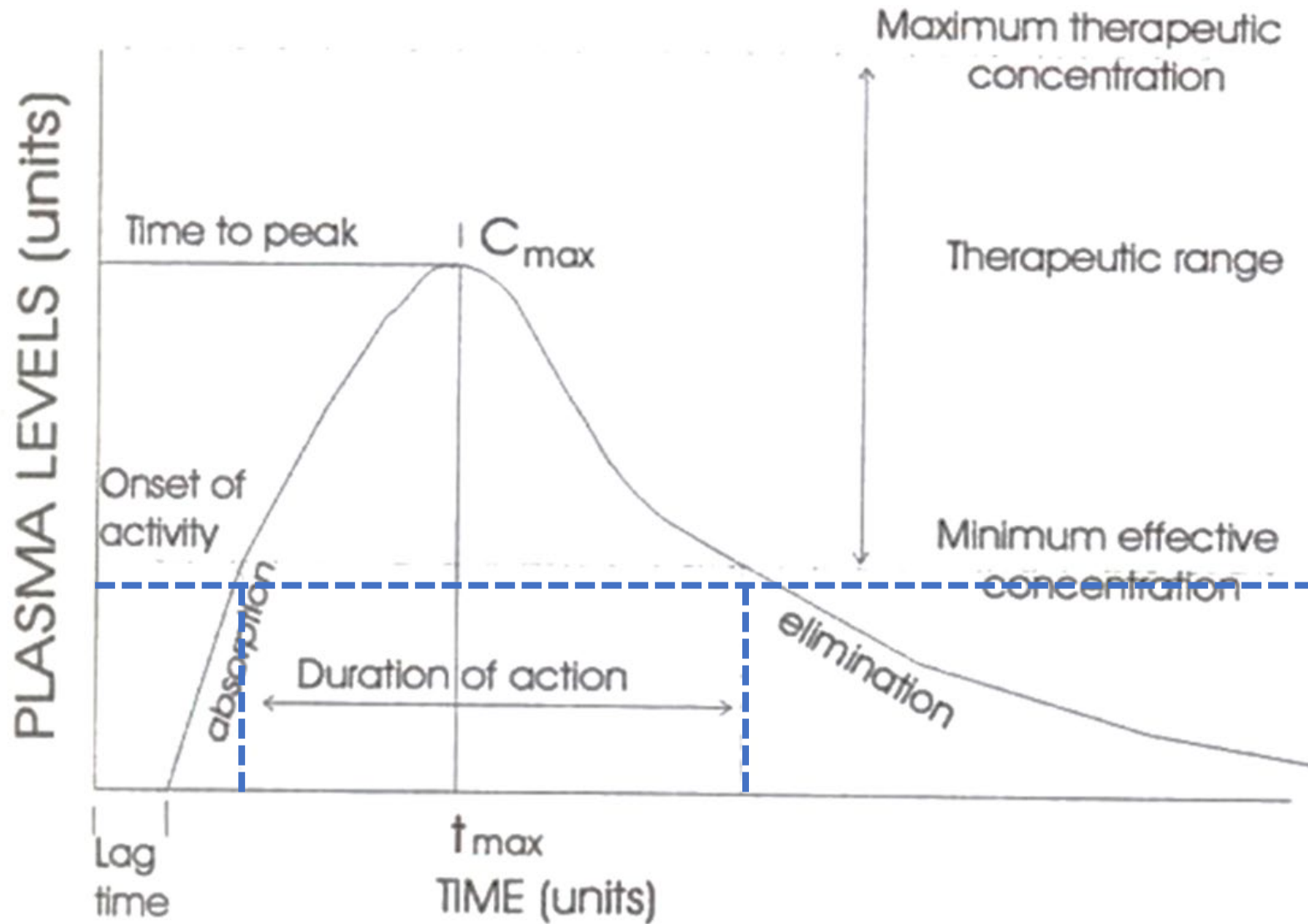
- A division of the science of pharmacology involving the **a**bsorption, **d**istribution, **m**etabolism, and **e**xcretion of a drug.

• **A D M E**

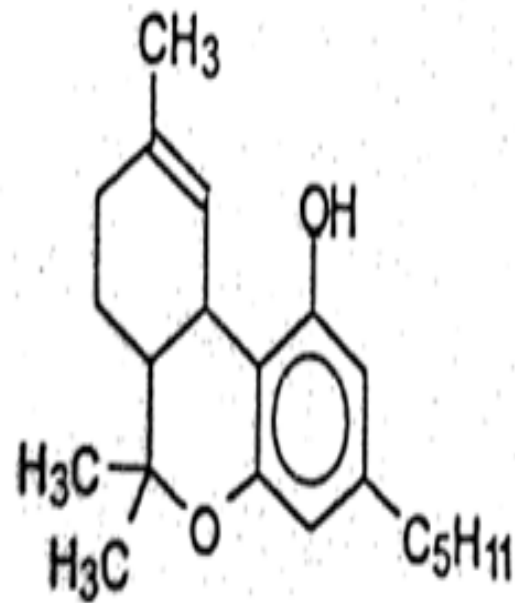
Area Under the Curve (AUC)



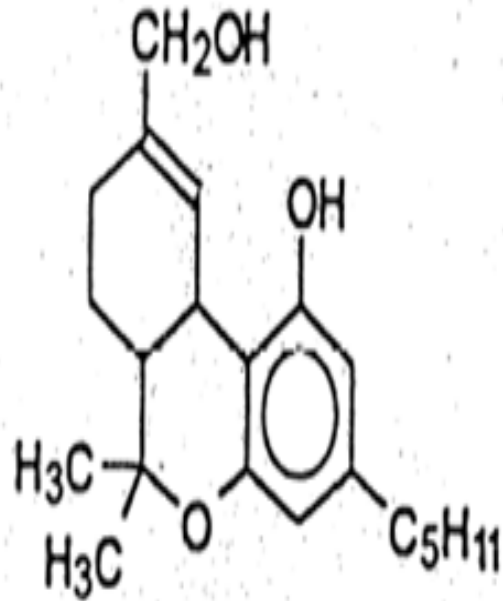
Terms to Know



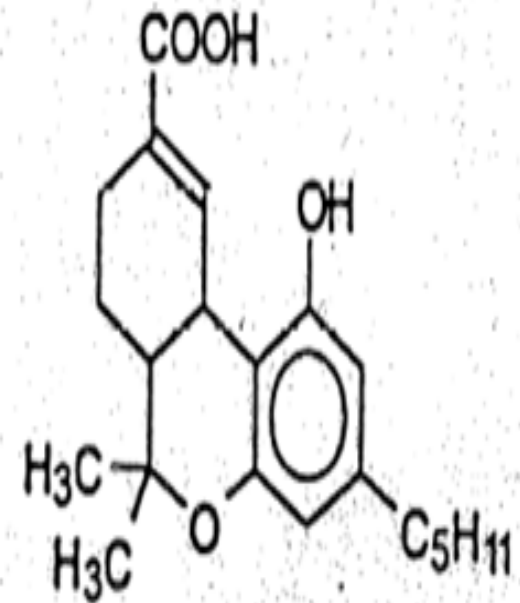
METABOLISM OF MARIJUANA



THC



11-OH-THC



11-COOH-THC

Marijuana Kinetics – LAW IN YOUR STATE?

- But the Judge said that Illinois law required him to find Dunn guilty of aggravated DUI because he had marijuana in his ‘system’. Dunn’s lawyer said he was not at the time impaired by the marijuana, which was in his system from a week earlier.
- The judge said the sentence was based on law, “not on emotion.”
- GUILTY PLEA / PER SE PROBATION SENTENCE

CHRONIC USE MAKES A DIFFERENCE IN INTERPRETATION OF THC DRUG TESTS

- Impact of Prolonged Cannabinoid Excretion in Chronic Daily Cannabis Smokers' Blood on Per Se Drugged Driving Laws
- Bergemusci et al. Clinical Chemistry, 59:3, 519-523 (2013)
- Cannabinoids can be detected in blood of chronic daily cannabis smokers during a **month** of sustained abstinence.
- These **PK** characteristics make it difficult to identify a minimum blood THC concentration consistently associated with impairment.

CHRONIC USE MAKES A DIFFERENCE IN INTERPRETATION OF THC DRUG TESTS

- All subjects' THC concentrations were 1 g/L within 7 days.
- THC median and maximum concentrations and percentage of subjects THC positive did not always decrease in a consistent manner.
- Participants showed highly variable THC and THCCOOH concentrations over time, with positive samples occurring days to weeks after initiation of abstinence.

Effect of Blood Collection Time on Measured $\Delta 9$ -Tetrahydrocannabinol Concentrations: Implications for Driving Interpretation and Drug Policy – Hartmann et al. Clin. Chem 62:2 367-77 (2016)

- Residual blood THC concentrations' fluctuation in this study's participants after placebo cannabis was consistent with gradual **extended THC release** after chronic frequent smoking
- Serum **THC concentrations** previously showed **poor correlation** with magnitude of neurocognitive performance impairment.
- Individual variability around the THC concentration during driving, and the rate of decrease varies on the basis of an individual's intake frequency, metabolism, and elimination rate.

Residual cannabis levels in blood, urine and oral fluid following heavy cannabis use

[Odell](#) et al. *Forensic Science International* 249 (2015) 173–180

- Blood THC levels are higher and persist longer in some individuals than previously described, our understanding and interpretation of THC levels in long term heavy cannabis users may need to be reconsidered
- The high whole blood THC concentrations over 5 ng/mL over multiple days is an important finding that extends our knowledge of cannabinoid drug concentrations during sustained abstinence.
- longest time that any subject had a blood THC concentration of 5 ng/mL or higher was 129 h.
- Threshold in your **State?**

Odell et al cont'd

- the high daily variation in each makes **it challenging to interpret** these levels in the usual forensic situation where there is usually only one measurement of these analytes available from a single set of specimens taken at a variable period after an incident under forensic investigation.

Bederka J. Marijuana Impairment.

O'Donnell's Drug Injury IVth (2016)

- the pharmacokinetics of THC/marijuana is much more complicated than that of alcohol or other drugs of abuse for that matter
- Thus, scientific consensus among pharmacologists is that **retrograde extrapolation is not scientifically valid** for marijuana/THC. Therefore, this analytical method should not be used for THC in legal cases.
- positive URINE test result, “does NOT indicate or measure intoxication.” And, Leiken and Paloucek assert that, “urine drug levels are **NOT** directly related to toxic symptom’s seen clinically

EXPERT OPINION IN REAR END MVC DEATH CASE

Long term and continuous **THC** abuse causes **cognitive impairment**, is demotivating , **alters perception**, **exacerbates** psychiatric and psychological conditions, and increases the **risk** of trauma and pulmonary disease.

REAR END COLLISION VICTIM- THC BLOOD TESTS

1. There is insufficient evidence to state with reasonable certainty that EM was impaired and/or intoxicated at the time of the occurrence;
2. Determination of impairment and/or intoxication cannot be based on blood cannabinoids concentrations alone;
3. There is no competent evidence to demonstrate that EM used cannabis on Crash date;
4. Urine cannabinoids test results do not provide competent evidence of impairment and/or intoxication, only past use;
5. Impairment and/or intoxication cannot be reasonably concluded from EM's acts and/or inactions on Crash date;

CRIMINAL SEXUAL ASSAULT DEFENSE

VICTIM INTOXICATED BY THC

1. Ms. C. was severely intoxicated and impaired by marijuana at the time of the alleged sexual assault.
2. She reported visual and perceptual disturbances, consistent with **hallucinations**. She reported significant central nervous depression signs, consistent with marijuana intoxication.
3. She consumed marijuana as an **edible**; that is, she swallowed the marijuana in a cookie. The metabolism of marijuana consumed by mouth is quite different than when smoked; an **abundance of a psycho-toxic active metabolite** (11-OH-THC) is formed by the liver metabolism that it absent in smoking. **Psychiatric toxicities are greater** with edibles/oral than with smoking.

4. Adolescents, especially naïve users, are subject to greater psychiatric toxicity and effects of marijuana than adults.

5. Marijuana psycho-toxicity causes distorted perceptions of reality, makes memory formation difficult, and **alters the thought and deliberation** processes of the marijuana intoxicated person.

6. Ms. C. herself describes her symptoms and experiences which are textbook signs of marijuana intoxication. Given this well documented toxicity, based on her description of the effects, her **memory** and recollections of the events of the evening are highly suspect and subject to **substantial doubt**.

WHY GREATER PSYCH RISK ORAL

- NO TITRATION OF THE 'DOSE'
- orally ingested THC - metabolism in the GUT & LIVER where there is a synthesis of a relatively significant amount of **11-OH-THC** that can combine its **psychotropic** affects with those of THC to produce an additive psychotropic affect in the CNS.
- 11-OH-THC IS A **PSYCHO**-ACTIVE METABOLITE OF THC

Aggravated dui/owi defense

Mr. K was not impaired by or under the influence of marijuana.... Neither his appearance on the video, the failure of certain FSTs, nor the toxicology tests provide proof of impairment. I disagree with the opinions expressed by DRE Officer.

Indeed, if you compare Mr. K's findings and compare them to **NHTSA**, there is no substantive evidence of support for DRE OFFICER's impairment opinion. Indeed, this is evidence of a lack of marijuana effects at the time of the Drug Recognition Evaluation.

TRIAL OUTLINE OF
JAMES THOMAS O'DONNELL, Pharm. D.

WISCONSIN V. CASAU

Reckless Vehicular Homicide Case

DECEDENT DRIVER INTOXICATED AND IMPAIRED BY
THC

DECEDENT CONTRIBUTED SIGNIFICANTLY TO CRASH

DEFENDANT TRUCK DRIVER ACQUITED

CHALLENGE TO ATTORNEYS

- LEARN, UNDERSTAND, APPLY SCIENCE OF PHARMACOLOGY AND PHARMACOKINETICS TO FACTS OF INDIVIDUAL CASES
- 'MEDICAL' VS 'RECREATIONAL' VS 'ILLEGAL' DIFFERENT LAWS AND SCIENTIFIC STANDARDS APPLY
- SELECT AN EXPERT TO ASSIST YOU IN ASSESSING THE CASE AND PRESENTING THE SCIENCE TO THE JURY

Medicolegal Aspects of Marijuana Colorado Edition

Edited by
Jay M. Titrock, MD



Anderson & Judge
Publishing Company, Inc.

O'Donnell's Drug Injury

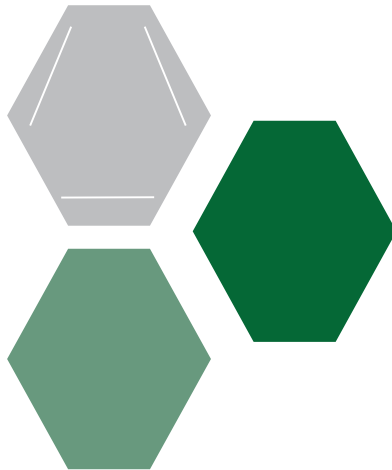
FOURTH EDITION

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