

Understanding Marijuana Terminology

THC - is the main psychoactive substance found in marijuana
AKA: delta-9-tetrahydrocannabinol (Δ^9 -THC), dronabinol

11-Hydroxy-THC - is the main psychoactive metabolite of THC formed in the body after marijuana consumption

AKA: Hydroxy THC, 11-Hydroxy- Δ^9 -tetrahydrocannabinol (11-Hydroxy- Δ^9 -THC), 11-OH-THC

11-nor-9-Carboxy-THC - is the main secondary metabolite of THC which is formed in the body after marijuana is consumed. It is NOT active.

AKA: THC-COOH (most often seen this way), Carboxy THC, 11-nor-9-carboxy-delta-9-tetrahydrocannabinol (11-nor-9-carboxy- Δ^9 -THC), 11-COOH-THC

Psychoactive or Active – causes euphoric and impairing effects (THC and 11-OH-THC)

Not active or inactive – does NOT cause euphoric or impairing effects (THC-COOH)

Parent compound or parent drug – the drug in the original form that it is ingested (THC)

Metabolite – a chemical created in the body as part of the process of breaking down the parent compound (11-OH-THC and THC-COOH)

Chronic vs. Occasional – Terms denoting frequency of use

Chronic – Continuing for a long time or recurring frequently

Occasional – Happening infrequently and irregularly

Recreational vs. Medical – Term denoting reason for use

Recreational - Taken for pleasure rather than for medical reasons

Medical - Relating to the science or practice of medicine

Tolerance - The capacity of the body to endure or become less responsive to a substance

Compensation - Behavior that develops either consciously or unconsciously to offset a deficiency

Plasma vs. Whole Blood

Plasma - The colorless fluid part of blood, lymph, or milk, in which corpuscles or fat globules are suspended.

Whole Blood - Blood drawn directly from the body from which none of the components, such as plasma or platelets, has been removed

Limit of Detection (LOD) - Lowest quantity of a drug that can be distinguished from the absence of that drug

Limit of Quantitation (LOQ) - Lowest amount of a drug in a sample that can be quantitatively determined

THC References 2013:

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8. Developing science-based per se limits for driving under the influence of cannabis (DUIC): Findings and recommendations by an expert panel, F. Grotenhermen, et al., September 2005
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14. The incidence of drugs in drivers killed in Australian road traffic crashes, O. Drummer, et al., *Forensic Science International* 134, 154 – 162, 2003
15. Psychomotor Function in Chronic Daily Cannabis Smokers during Sustained Abstinence, W. Bosker, et al., *PLOS one* 8(1): e53127, 2013
16. Reversible and regionally selective downregulation of brain cannabinoid CB 1 receptors in chronic daily cannabis smokers, J. Hirvonen, et al., *Molecular Psychiatry*, 17, 642-649, 2013
17. Impact of Prolonged Cannabinoid Excretion in Chronic Daily Cannabis Smokers' Blood on Per Se Drugged Driving Laws, M. Bergamaschi, et al., *Clinical Chemistry*, 59:3 519-526, 2011
18. Acute cannabis consumption and motor vehicle collision risk: systematic review of observational studies and meta-analysis, M. Asbridge, et al., *BMJ*, 344 e536 1-9, 2012
19. Impairment due to cannabis and ethanol: clinical signs and additive effects, J. Bramness, et. al., *Addiction*, 106, 1080-1087, 2010

THC Research Summary

Number in () correspond to the THC References 2013 document

- **Culpability** (11,12, 18)
 - Validated methods used to determine culpability
 - Crash risk correlated to THC level in blood
 - 5ng/mL THC in blood = 6.6 times more likely to be responsible for crash
 - No correlation between impairment and THC COOH in blood or urine
- **Psychomotor** skill and other types of impairment (11, 15, 16, 17)
 - Highly automated behaviors are affected most. Critical tracking (6) divided attention tasks and complex tasks are also impaired. Driving is a very complex task.
 - Lane deviation and short term / working memory for complex tasks
- A person cannot fully **compensate** for the impairment from THC even with frequent use (15, 16, 17)
 - By overcompensating for self preserved impairment someone could overcome some of the impairing effects but: only for short periods of time, only for simple tasks, not enough to totally counteract the impairment, greater demand or unexpected situations - it does not help
 - Impairment is seen in both chronic and occasional users (8)
- THC levels in whole blood are scientifically supported for DUID per se for THC
 - 2 – 5 ng/mL THC in whole blood (4, 6, 8, 11, 12, 17, 18)
 - **Impairment is dose dependent and supported by signs of impairment**
 - The level takes **frequent (chronic) use** into consideration
- **Residual levels** are 1-3ng/mL THC in blood seen in chronic users (4, 10, 15, 16, 17)
 - Chronic use: Daily or near daily use often with multiple times used per day
- BMI does not effect elimination (4)
- The blood is almost never drawn onsite the delay can cause false negatives (missed window of opportunity) (8)
- The blood being tested is not randomly collected but instead collected from people which were suspected of being under the influence
 - SFSTs article 2004 – Standard Field Sobriety Tests are a moderate indicator of THC impairment. Better if you include Head Movements and Jerks (HMJ). (2)
- **Route of administration**
 - **Oral** (10, 11, 13)
 - Peak THC levels in the blood are always lower than the same dose taken by smoking
 - For a single dose the peak is around 2-3 hours after it is taken
 - Peak can be as high as 8ng/mL whole blood
 - Oral doses can cause impairment but it is normally only seen for 1-2 hours
 - Blood THC levels after single OR multiple doses drops below 5ng/mL blood in 4-6 hours after dosing is stopped
 - In conclusion, taking THC orally is much like taking other impairing pain killers. Driving will be impaired for a short time but if they wait 4-6 hours from last dose they are ok to drive.
 - **Smoked** (1, 3, 6, 9, 15)
 - Peak THC levels in blood seen while smoking
 - Peak levels in blood can be in the 100s of ng/mL
 - Impairment highest in first hour after use (6)
 - THC levels generally drop below 5ng/mL is 3 hrs or less
- Should be noted that alcohol plus THC have additive effects on driving (8, 11, 19)