



The Cannabis - Psychosis - Schizophrenia Connection

Marijuana is popular because it alters perceptions.
Psychosis revolves around misperceptions.



What is psychosis?

Psychosis is a neurological symptom involving unusual experiences or beliefs. It happens when the conscious mind tries to make sense of the misperceptions that can happen when the brain becomes inefficient at processing information.

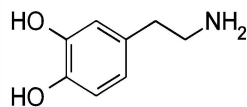
What is schizophrenia?

Schizophrenia is a form of long-term psychosis that can't be explained by other medical conditions. It often involves changes in important brain chemicals like dopamine, glutamate, serotonin, or anandamide.

The Chemical Effects of Cannabis resemble the Biochemistry of Psychosis

Cannabis triggers dopamine release.¹

Most people with psychosis or schizophrenia release too much dopamine.

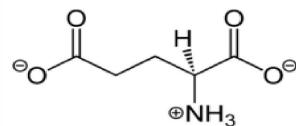


DOPAMINE

Dopamine is a chemical signal for significance. Misperceiving significance can lead to psychosis.

Cannabis reduces glutamate release.²

Many people with psychosis or schizophrenia have weak glutamate signals.

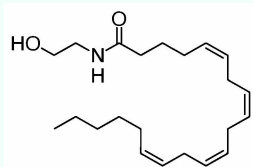


GLUTAMATE

Glutamate is the brain's most abundant neurotransmitter. It's especially important in the networks that form perceptions. Other drugs that reduce glutamate signals (like ketamine or PCP) can produce psychosis.

Cannabis reduces the level of protective anandamide.³

Low anandamide levels correspond to more severe symptoms of psychosis in people with schizophrenia.⁴

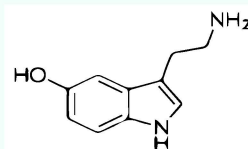


ANANDAMIDE

Named after the Sanskrit word for bliss, anandamide reduces brain inflammation and protects the brain against schizophrenia.

Frequent exposure makes the hallucination-producing 2A-type of serotonin receptor more sensitive.⁵

Many people with schizophrenia have abnormal 2A-type serotonin receptors.



SEROTONIN

Serotonin is part of the brain circuits that create perception. Drugs like LSD or psilocybin produce their hallucinations by turning on the 2A-type of serotonin receptor.

Sources:

1. Bloomfield, M. A. P., Ashok, A. H., Volkow, N. D. & Howes, O. D. The effects of Δ9-tetrahydrocannabinol on the dopamine system. *Nature* 539, 369–377 (2016).
2. Sánchez-Blázquez, P., Rodríguez-Muñoz, M. & Garzón, J. The cannabinoid receptor 1 associates with NMDA receptors to produce glutamatergic hypofunction: implications in psychosis and schizophrenia. *Front Pharmacol* 4, 169 (2014).
3. Morgan, C. J. A. et al. Cerebrospinal fluid anandamide levels, cannabis use and psychotic-like symptoms. *The British Journal of Psychiatry* 202, 381–382 (2013). Koethe, D. et al.
4. Anandamide elevation in cerebrospinal fluid in initial prodromal states of psychosis. *Br J Psychiatry* 194, 371–372 (2009).
5. Ibarra-Lecue, I. et al. Chronic cannabis promotes pro-hallucinogenic signaling of 5-HT2A receptors through Akt/mTOR pathway. *Neuropsychopharmacology* 43, 2028–2035 (2018).

Cannabis Causes Schizophrenia-Like Changes in Animals

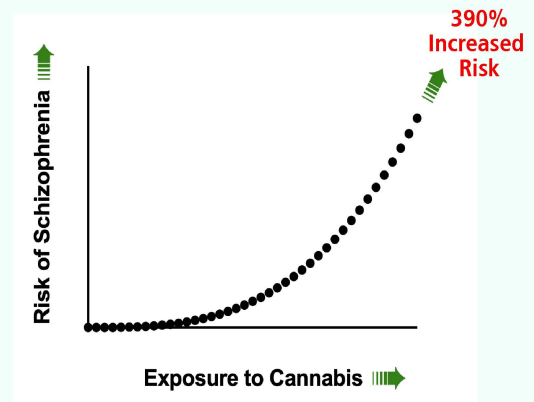
Giving THC to animals changes their:

- Emotional response
- Social behavior
- Motivation
- Activity
- Brain function

In ways that resemble schizophrenia in people.⁶



Schizophrenia Risk Goes up with More Frequent Cannabis Use



Based on 10 separate studies, frequent cannabis users have nearly 4 times greater risk for schizophrenia.⁷

Cannabis Causes Schizophrenia-Like Changes in People



THC causes psychosis in healthy human beings and usually worsens symptoms in people with schizophrenia.⁸

Canadian Warning Label



The government of Canada requires this health warning on all cannabis packages.⁹

Source:

6. Renard, J., Rushlow, W. J. & Laviolette, S. R. What Can Rats Tell Us about Adolescent Cannabis Exposure? Insights from Preclinical Research. *Can J Psychiatry* 61, 328–334 (2016).

7. Marconi, A., Di Forti, M., Lewis, C. M., Murray, R. M. & Vassos, E. Meta-analysis of the Association Between the Level of Cannabis Use and Risk of Psychosis. *Schizophr Bull* 42, 1262–1269 (2016).

8. Sherif, M., Radhakrishnan, R., D'Souza, D. C. & Ranganathan, M. Human Laboratory Studies on Cannabinoids and Psychosis. *Biol. Psychiatry* 79, 526–538 (2016).

9. <https://www.canada.ca/en/health-canada/services/drugs-medication/cannabis/laws-regulations/regulations-support-cannabis-act/health-warning-messages.html>