A Scientific View of the Cannabis Debate

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Whether cannabis should be legalised is the subject of a long-standing debate, usually focused on its social implications—such as addiction and therapeutic uses—and better management of its use. Currently, cannabis is a class C drug, but there are strong arguments, based on new scientific evidence, that the drug should be reclassified to class B—meaning that stricter sentences could be given to those found possessing or selling it. Recent studies suggest that the population risk of developing schizophrenia, normally less than 1%, rises to nearly 4% lifetime risk after the frequent use of cannabis as an adolescent *(1)*.

As a drug, cannabis is sold on the streets with a variety of names, but its main active components are Δ^9-tetrohydrocannabinol (THC) and cannabadiol. The link between psychosis and cannabis is thought to be centred on THC, which likely interferes with the normal function of the endocannabinoid system. Naturally occurring 'endocannabinoids' normally bind to the cannabinoid receptors, CB1 and CB2. One of the results of this is negative feedback, reducing the formation of more endocannabinoids so that the receptors are not overstimulated. THC, however, also binds to these receptors, and interferes with this feedback, leading to the production of more endocannabinoids. The rise in these chemicals, which are acting as neurotransmitters, can lead to abnormal brain function.

The comments made by subjects under the influence of THC show a close likeness to the symptoms experienced by schizophrenic patients. Grandiosity, inability to filter out irrelevant background stimuli, loss of insight and paranoia are all classic symptoms of schizophrenia. This similarity

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strengthens the argument that there is a causal link between schizophrenia and THC usage.

Previous studies have shown that the psychotic effects of THC are mediated by the CB1 receptors. A study by Wiley *et al.* showed how the effects of THC can be reversed in rats by pre-treatment with a receptor-blocking agent *(2)*. THC primarily acts by altering neurotransmitter levels, and can affect the levels of a variety of neurotransmitters at nerve connections. When considering psychotic symptoms, it is thought that the THC is responsible for increasing levels of dopamine and glutamate *(3)*. Dopamine release is associated with reward, goal-directed behaviour and hedonic pleasures, giving rise to the 'high' during cannabis intake. The use of THC is shown to increase levels of dopamine in the brain, an effect first shown in a study undertaken by Voruganti *et al. (4)*.

Not all psychosis, or even all schizophrenia, can be attributed to cannabis

In spite of the evidence that points towards cannabis as a potential factor causing psychosis, the fact remains that not all cannabis users are psychotic and not all psychosis, or even all schizophrenia, can be attributed to cannabis. Genetic studies may provide more answers: a study by Henquet *et al.*, for example, showed that people with a certain genotype are more susceptible than others to psychosis following cannabis use *(5)*.

Scientific evidence seems to show a strong relation between cannabis and psychosis, but the major concern when considering the legalisation of cannabis is the current effects of cannabis on the population. Studies have shown that cannabis usage is almost twice as high in schizophrenic patients as compared to the normal population *(6)*, but it is not obvious where the cause and effect are in this relationship. Surveys also revealed that 40% of a group of psychotic patients reported cannabis use at some time in their lives *(7)*, although it is difficult to define a comparable control group.

It has been shown that there is a correlation, and a plausible mechanism for a link, between cannabis usage and schizophrenia *(8)*. If cannabis can cause schizophrenia, how does this influence the debate on its legality? Taken at face value, it might seem that it is a strong argument for keeping cannabis illegal. Then again, it is inarguable that tobacco has a whole range of long-term health consequences. Should we be more afraid of cannabis simply because its consequences are mental problems, rather than lung cancer? It could be argued that it is more acceptable to legalise the drug the better we understand its effects, as it allows potential users to make an informed choice.

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