Cannabis use and psychiatric disorders

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Cannabis is one of the oldest, and one of the most widely abused substances. It is available in all parts of the world where it is used commonly as a recreational drug when smoked or consumed in some other ways. It also has some medicinal potential, the reason for which some are calling for its legalization. Cannabis has been associated with several psychiatric problems such as anxiety problems, mood disorders, adjustment problems, acute organic problems, and psychosis such as schizophrenia. The link between these problems is highlighted in this short review.

Pharmacology. The principal component of cannabis is delta-9-Tetrahydocannabinol (Δ-9-THC). The plant, however, contains more than 400 chemicals, of which 60 are chemically related to Δ-9-THC. In humans, Δ-9-THC is rapidly converted to 11-hydroxyl delta-9-THC, the metabolite that is active in the central nervous system. 11-OH-9-THC is approximately 3 times more psychoactive. Oral cannabis is very powerful, almost psychedelic. The receptor for cannabinols is known as the cannabinoid (CB) receptor. It is a member of the G-protein linked family receptors. The CB receptor is linked to the inhibitory G-protein (Gi), which is linked to adenyl cyclase in an inhibitory fashion. The receptor abounds in the basal ganglia, hippocampus, cerebellum, and cerebral cortex. The brain stem does not have the receptors, hence, there is little effect of cannabis on the respiratory and cardiovascular systems.

Human response to cannabis. Many variables affect the psychoactive properties of cannabis. These include: the potency of the cannabis used (as described above), the route of administration, the smoking technique, the dose, the user's experience, and expectation, and the biological vulnerability of the user. Cannabis induces a state of intoxicated relaxation, euphoria, and dreaminess. It is quick acting. Smoked, the first effects are usually felt within seconds. The peak follows within minutes and then declines sharply after approximately 55 minutes, with a 90 minute tail-off. Cannabis produces a general sense of well-being, relaxation, and euphoria. Introspective dreaminess, increased appreciation of music, sleepiness, and time distortion is often felt by the user. The effects, however, can be subtle. The first time user often detects little or no effect. Cannabis increases heart rate but decreases blood pressure. At high doses, orthostatic hypotension may appear. Increased appetite (munchies) and dry mouth are other effects of cannabis and may indicate intoxication. It dilates the conjunctival blood vessels (blood shot eyes, red eye) and may impair short-term memory.

Cannabis and mood changes. While some people may use cannabis with little negative effects, in others it may trigger an effect that will impact greatly on their lives. Many people will use cannabis once and experience panic attacks, dissociative symptoms, and anxiety. Other people may use cannabis for years before experiencing their first panic attack. Anxiety symptoms are also evidence of cannabis intoxication. The acute response to cannabis generally includes euphoria and a feeling of detachment and relaxation. These are short lived but may persist with continued use. Other long-term affective effects of cannabis include adjustment disorder, major depression, and dysthymia. A recent study exploring the association between cannabis uses and depression concluded that heavy cannabis use and depression are associated, and evidence from longitudinal studies suggested that heavy cannabis use may increase depressive symptoms among some users.[1]

Cannabis and dopamine. Dopamine appeared very early in evolution and is involved in many functions that are essential for survival of the organism, such as motor functions, attentiveness, motivation, learning, and memorization. But most of all, dopamine is a key element in identifying natural reward for the organism. It has been established that all substances that trigger dependence in humans increase the release of dopamine in the nucleus accumbens.[2] The sensations of slight euphoria, relaxation, and amplified auditory and visual perceptions produced by Marijuana are due almost entirely to its effect on the CB receptors in the brain. These receptors are present almost everywhere in the brain, and an endogenous molecule that binds to them naturally has been identified: anandamide. Anandamide is involved in regulating mood, memory, appetite, pain, cognition, and emotions. When cannabis is introduced into the body, its active ingredient Δ-9-THC can therefore interfere with all these functions.[2] The THC binds to CB_1 receptors (cannabinoid receptor 1) for anandamide. These receptors then modify the activity of several intercellular enzymes, including cyclic adenosine monophosphate (cAMP) whose activity they reduce. Less cAMP means less protein kinase A. The reduced activity of this enzyme affects the potassium, and calcium channels to reduce the amount of neurotransmitters released. The general excitability of the brain's neural networks is thus also reduced. However, in the reward circuit, just as with other drugs, more dopamine is released. As with opiates, this paradoxical increase is explained by the fact that dopaminergic neurons in this circuit do not have CB_1 receptors, but are normally inhibited by Gamma Amino Butyric Acid (GABA) neurons. Cannabis removes the inhibition by the GABA neurons and hence activates the dopamine neurons. In chronic consumers of cannabis, the loss of CB_1 receptors in the

brain's arteries reduces the flow of blood, and hence of glucose, and oxygen, to the brain. The main results are attention deficits, memory loss, and impaired learning ability. The cannabis effect on dopamine has been supported by other studies.[3,4] Therefore, the association of cannabis with mood disorders, other psychological problems, and psychosis is not surprising.

Cannabis and risk of psychosis. The relationship between cannabis and psychosis can be summarized as follows: a) Acute use of large doses of the drug can induce a toxic or organic psychosis with symptoms of confusion and hallucination, which remit on abstinence. b) Cannabis use may lead to an acute functional psychosis, similar to an acute schizophreniform state. c) Cannabis use may lead to a chronic psychosis, which persists after abstinence. d) Long term cannabis use may lead to an organic psychosis, which only remits after abstinence, leaving a residual deficit state, sometimes called an amotivational syndrome, which is thought to be analogous to the chronic organic brain syndrome seen after prolonged misuse of alcohol. Cannabis use is also associated with high rates of comorbidity for other psychiatric diagnosis. The most common are adjustment disorders with depressed mood, major depression, and dysthymia, schizophrenia, and other substance use disorders. The epidemiologic catchments area study reported that the risk of meeting the criteria for a substance misuse disorder was 4.6 times higher in those suffering from schizophrenia than in the general population. Schizophrenia was associated with a six-fold increase in risk of developing a drug use disorder, and cannabis was the most commonly misused drug. A recent review[5] on the causal risk factor of cannabis for psychosis showed that all the available population based studies have found that cannabis use is associated with later schizophrenia outcomes in that they support the concept of temporal priority by showing that cannabis use most probably preceded schizophrenia. The reports also provided evidence for direction by showing that the association between adolescent cannabis use, and adult psychosis persists after controlling for many potential confounding variables such as disturbed behavior, low IQ, place of upbringing, cigarettes smoking, poor social integration, gender, age, ethnic group, level of education, unemployment, single marital status, and previous psychotic symptoms. The review further noted that overall, cannabis use confers a two-fold risk of later schizophrenia or schizophreniform disorders.

In conclusion, cannabis is a psychoactive drug, which is widely abused. Its consumption modulates dopamine concentrations in certain brain areas, and can thus induce or modulates the development of psychotic symptoms and psychoses. Cannabis can induce other mental disorders such as depression, adjustment problems, and dysthymia as well as a chronic defect, amotivational, state. Its use as a recreational drug should therefore be avoided. People calling for its legalization on the basis of its medicinal potential should exercise restraint until a pure medicinal component of the plant is approved and widely available. Information campaigns should be intensified in the media on the potential harm of its use. Lastly, people who are already using cannabis or who are already dependent need our help and should not be criminalized. Instead, they should be assisted to see expert psychiatrists, psychologists, counselors, and so forth, who could help with this problem.

Received 20th November 2006. Accepted 3rd March 2007.

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