

5. Cannabis and Memory

By Kevin Baiko, M.D.

It is a common joke concerning cannabis... how it can cause a user to forget what he was saying mid-sentence. While this short term “brain fart” phenomenon is kind of funny to witness, some casually regard it as evidence that cannabis use “fries” your brain like an egg as depicted in those old “This is your brain on drugs” television messages. While most drug propaganda pieces are hilarious to the informed viewer (whether under the influence of cannabis or not), they have scared countless trusting or otherwise naïve people into supporting the criminalization of cannabis use. But what does actual science say? Does cannabis use actually cause brain damage? In a word, no. Does cannabis contribute to memory loss? Yes and no. Might the ability to forget serve a purpose in the healing process? Absolutely!

The first “scientific” study linking cannabis to brain damage emerged from the monkey suffocation studies conducted at Tulane University in the 1970’s, which clearly demonstrated brain damage in rhesus monkeys after cannabis exposure. President Reagan cited these studies as justification to escalate the war on drugs in the 1980’s, but he failed to mention a few important facts about these studies. First, the brain damage was actually caused by lack of oxygen from excessive forced cannabis smoke inhalation. Second, these suffocation studies were thereafter contradicted by research at the National Center for Toxicological Research in Arkansas, which demonstrated no brain damage when equivalent quantities of cannabis smoke was administered with adequate amounts of oxygen. Since then, even despite cannabis research prohibition in the U.S., an impressive body of scientific findings has accumulated which finds no significant link between cannabis use and brain damage.

To the contrary, several cannabinoids demonstrate neuroprotective and neurogenic properties. A study from 2001 found THC and CBD to be neuroprotective antioxidants and that CBD protects neurons more effectively than either vitamin C or E. In 2006, researches at the Scripps Institute published a study comparing THC to standard of care medications being used to treat Alzheimer’s dementia (acetylcholinesterase inhibitors). This study found that THC is a considerably superior inhibitor to the formation of the amyloid beta plaques characteristic of the disease. In addition to preventing neuroinflammation, cannabinoids enhance neurogenesis (new nerve cell growth). In other words, cannabis seems to prevent brain damage, and shows remarkable promise in the treatment of such neurodegenerative disorders as Alzheimer’s Dementia. Since then other studies have confirmed the remarkable promise in the early treatment of traumatic brain injuries and stroke, as well as slowing the progression of ALS & Parkinson’s disease. Findings from a 2009 study in Neurotoxicity and Teratology suggest that cannabis can protect the brain from damage caused by alcohol poisoning (Jacobus *et al*). So cannabis, a criminalized plant, actually reverses toxic effects of alcohol, which is legal. Adding public policy insult to drug war injury, since 2003 the U.S. government has held a patent (US Patent 6630507) for the antioxidant and neuroprotective effects of cannabinoids, yet continues to designate cannabis as a Schedule I drug for which there is

“no legitimate medical use” with “high risk of abuse”, effectively stalling the advancement of cannabinoid medical research and therapeutic application.

With all these antioxidant, neuroprotective and neurogenic effects, an independently thinking individual may reach the conclusion that cannabis actually improves memory. One study found that older rats subjected to one puff of cannabis demonstrate improved short term memory. On the other hand, younger rats subjected to the same dosing demonstrated decreased short term memory. Both groups returned to their baseline short term memory once cannabinoids had cleared their system (Marchalant & Wenk). There are several take home messages we can glean from these findings: 1. Younger persons may score lower on tests requiring memory retention after using cannabis, 2. Older persons may score higher on such tests after using cannabis, 3. Neither group will suffer long term impairment or improvement of memory after using cannabis.

Of course, we tend to consider such findings with the presumption that good memory is a part of good health, but what constitutes healthy memory? Are we better off remembering every detail of every day or only the relevant details? What about our traumatic experiences? I hesitate to describe a concrete ideal of mental health here, as some individuals demonstrate extraordinary memory, but not necessarily without paying a price for it. I recently read of one autistic man who realistically drew the entire New York skyline, detail by detail, after a 20 minute helicopter ride over it. The fact he was autistic should not go unnoticed, as autistic individuals are notorious for their tendency to suffer sensory overload in environments where most of us cope with fine. Cannabinoid researcher Di Marzo famously described the ability to forget as one of the primary pro-homeostatic mechanisms for stress recovery and adaptation regulated by the endocannabinoid (eCB) system. This system mediates the extinction of aversive memories and adaptive processes. Often times it is better to forget and cannabis can help.

Studies on fear conditioning illustrate this point. When animals are subjected to a threatening stimulus, many instinctively freeze in fear. This freeze response extinguishes (tapers off) over time due to stimulation of the eCB system in the amygdala. In other words, the test subjects, learning that the stimulus is no longer coupled with the threat, suppress/forget the aversive memory over time. However, when the eCB system is blocked, no such tapering is demonstrated. If it wasn't for our eCB system, it would be very difficult to unlearn adaptive responses that don't serve us. We would lose our ability to overcome our instinctively rooted and traumatically incurred fears.

Our ability to forget is of particular relevance to understanding and treating the condition known post-traumatic stress disorder (PTSD). Some events are so traumatic that the individuals psychologically re-experience the events again and again, causing them to avoid stimuli associated with the trauma and leading to significant distress and social impairment. PTSD is associated with dysfunction in many of the same brain regions hosting an abundance of eCB receptors (including the amygdala.) It is hardly surprising then that many suffering PTSD self-medicate with cannabis. One recent pilot study conducted in Israel demonstrated a reduction of chronic combat PTSD symptoms

(Mashiah) amongst the subjects medicated with cannabis. Whatever the actual mechanism, the most common report from my PTSD patients is that cannabis blunts their post-traumatic symptoms and helps them calm down.

Most, if not all of us, experience multiple traumas in the normal course of our lives: sprained ligaments, strained muscles, broken bones, bruises, burns, etc. Osteopathic theory suggests that our body “remembers” these traumas, and as such holds the body in a dysfunctional state until the traumatic forces stored in the tensegrity of its tissues - or the memory thereof - can be released. To facilitate this release, I routinely prescribe exercises and stretches to follow their cannabis use. Not only does the cannabis relax muscles, ease pain and increase body awareness – all invaluable aids to physical therapy, I believe it actually helps the body to forget old traumas and to relearn how to move functionally again. Not only does it aid in trauma resolution, it can therapeutically and educationally enhance the experience of yoga, body work, martial arts and other body-mind exercises. Honestly, if I have one complaint about cannabis, it is this: its capacity to help us relax, loosen up and let go, can undermine one's sense of discipline – perhaps helpful for those trying to extinguish old habits, perhaps counterproductive for those trying to cultivate the discipline required to establish new lifestyle practices.

In conclusion, cannabis does not cause brain damage. If anything, it seems to prevent many of the neurodegenerative processes associated with normal aging, chronic dementia and traumatic brain injury. It has proven an invaluable medicine in the treatment of post-traumatic stress conditions. Many of my patients use it only at day's end... to forget about their stresses and pain enough to get a healing night's rest and...

Now, what was I saying?

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