

Study examines potential effect of regular marijuana use on vision

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A dried flower bud of the Cannabis plant. Credit: Public Domain

A small, preliminary study has found an abnormality involving the retina that may account for altered vision in regular cannabis users. The results are published online by *JAMA Ophthalmology*.

Vincent Laprevote, M.D., Ph.D., of the Pole Hospitalo-Universitaire de Psychiatrie du Grand Nancy, Laxou, France, and colleagues examined whether the regular use of cannabis could alter the function of [retinal ganglion cells](#) (RGCs), which are the last and most integrated stage of retinal processing and the first retinal stage providing visual information in the form of [action potentials](#), such as is found in the brain. Because cannabis is known to act on central neurotransmission, studying the retinal ganglion cells in individuals who regularly use cannabis is of interest.

To verify if cannabis disturbs RGC function in humans, the researchers used a standard electrophysiological measurement called pattern electroretinography (PERG), which involved

averaging a high number of responses, thereby ensuring reproducibility of the results. With PERG, the best marker of RGC function is a negative wave—the N95 wave—2 parameters of which are usually known as the amplitude and the implicit time, which denotes the time needed to reach the maximal amplitude of N95.

Twenty-eight of the 52 study participants were regular [cannabis users](#), and the remaining 24 were controls. After adjustment for the number of years of education and alcohol use, there was a significant increase for cannabis users of the N95 implicit time on results of pattern electroretinography (median, 98.6 milliseconds, compared with controls, 88.4 milliseconds).

"This finding provides evidence for a delay of approximately 10 milliseconds in the transmission of action potentials evoked by the RGCs. As this signal is transmitted along the visual pathway via the optic nerve and lateral geniculate nucleus [a relay center in the thalamus for the visual pathway] to the visual cortex, this anomaly might account for altered vision in regular cannabis users," the authors write. "Our findings may be important from a public health perspective since they could highlight the neurotoxic effects of cannabis use on the central nervous system as a result of how it affects retinal processing."

"Independent of debates about its legalization, it is necessary to gain more knowledge about the different effects of cannabis so that the public can be informed. Future studies may shed light on the potential consequences of these retinal dysfunctions for visual cortical processing and whether these dysfunctions are permanent or disappear after cannabis withdrawal."

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