

THE COGNITIVE NEUROPHYSIOLOGICAL EFFECTS OF MEDICINAL MARIJUANA IN HIV+ PATIENTS WITH PERIPHERAL NEUROPATHY

Aaron B. Ilan¹, Alan Gevins¹, Kemi Role¹, Hector Vizoso², Donald I. Abrams²

¹SAM Technology and the San Francisco Brain Research Institute, San Francisco, CA, USA

²Community Consortium, University of California, San Francisco, CA, USA

Introduction: Animal and human data suggest that cannabinoids hold promise in treating the neuropathic pain that often accompanies diseases such as cancer and AIDS. If cannabinoids are to be used therapeutically in this regard, it is important to understand their side-effects on cognitive brain function. Accordingly, we evaluated the cognitive neurophysiological effects of cannabis by measuring electroencephalographic (EEG) signals and event-related potentials (ERPs) during performance of immediate working memory (WM) and delayed episodic memory (EM) tasks in a study assessing the safety and efficacy of smoked marijuana in patients with HIV-related peripheral neuropathy.

Methods: Twenty-four experienced marijuana smokers with a diagnosis of HIV-related peripheral neuropathy participated in a randomized, double blind, placebo-controlled study. Patients resided in the inpatient General Clinical Research Center at San Francisco General Hospital for 7 days, and smoked a placebo or marijuana cigarette (3.56% THC) 3 times daily during the last 5 days. Cognitive neurophysiological testing was performed on Day 2, on which no drugs were administered, and on Days 4 and 6, before and after the afternoon cigarette was smoked.

Results: Subjective measures of intoxication increased after marijuana smoking relative to placebo, but alertness and anxiety were unchanged. Marijuana did not affect reaction times in any of the tasks. However, after smoking marijuana WM task response accuracy decreased and cortical activation (as indexed by 9-11 Hz EEG alpha power) increased. In the EM task, marijuana led to a response bias in which even previously unseen words were categorized as having been seen before. Marijuana reduced attentional allocation during the EM task, as indexed by reduced N400 and Slow Wave ERP amplitude.

Conclusion: The results suggest that marijuana smoked by patients with HIV-related peripheral neuropathy directly or indirectly affects neurophysiological processes regulating immediate working memory and delayed episodic verbal memory. Patients who smoke marijuana to relieve peripheral neuropathy may therefore experience difficulty sustaining focused attention and remembering recently learned information for a few hours after each dose. Further research is required to understand the mechanisms underlying these effects.

Acknowledgement: This research was supported by grants to SAM Technology and to UCSF from the National Institute on Drug Abuse and the University of California Center for Medicinal Cannabis Research.