

Original Article

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Adolescent Cannabinoid Exposure Permanently Suppresses Cortical Oscillations in Adult Mice

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Abstract

Regular marijuana use during adolescence, but not adulthood, may permanently impair cognition and increase the risk for psychiatric diseases, such as schizophrenia. Cortical oscillations are integral for cognitive processes and are abnormal in patients with schizophrenia. We test the hypothesis that adolescence is a sensitive period because of the active development of cortical oscillations and neuromodulatory systems that underlie them. The endocannabinoid system upon which marijuana acts is one such system. Here we test the prediction that adolescent cannabinoid exposure alters cortical oscillations in adults. Using *in vitro* local field potential, *in vivo* electrocorticogram recordings and cognitive behavioral testing in adult mice, we demonstrate that chronic adolescent, but not adult, cannabinoid exposure suppresses pharmacologically evoked cortical oscillations and impairs working memory performance in adults. The later-maturing prefrontal cortex is more sensitive to adolescent exposure than the earlier-maturing, primary somatosensory cortex. These data establish a link between chronic adolescent cannabinoid exposure and alterations in adult cortical network activity that underlie cognitive processes.

Keywords: marijuana; development; schizophrenia; Δ -9 tetrahydrocannabinol; novel object recognition; neural synchrony



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