

Boosting natural marijuana-like brain chemicals treats fragile X syndrome symptoms

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American and European scientists have found that increasing natural marijuana-like chemicals in the brain can help correct behavioral issues related to fragile X syndrome, the most common known genetic cause of autism.

The work indicates potential treatments for anxiety and [cognitive defects](#) in people with this condition. Results appear online in *Nature Communications*.

Daniele Piomelli of UC Irvine and Olivier Manzoni of INSERM, the French national research agency, led the study, which identified compounds that inhibit enzymes blocking endocannabinoid transmitters called 2-AG in the striatum and cortex regions of the brain.

These transmitters allow for the efficient transport of [electrical signals](#) at synapses, structures through which information passes between neurons. In [fragile X syndrome](#), regional synapse communication is severely limited, giving rise to certain cognitive and behavioral problems.

Fragile X syndrome is caused by a mutation of the [FMR1 gene](#) on the [X chromosome](#). People born with it are mentally disabled; generally experience crawling, walking and [language delays](#); tend to avoid eye contact; may be hyperactive or impulsive; and have such notable physical characteristics as an elongated face, flat feet and large ears.

The researchers stress that their findings, while promising, do not point to a cure for the condition.

"What we hope is to one day increase the ability of people with fragile X syndrome to socialize and engage in normal cognitive functions," said Piomelli, a UCI professor of anatomy & neurobiology and the Louise Turner Arnold Chair in the Neurosciences.

The study involved mice genetically altered with FMR1 mutations that exhibited symptoms of fragile X syndrome. Treated with novel compounds that correct 2-AG protein signaling in brain cells, these mice showed dramatic behavioral improvements in maze tests measuring anxiety and open-space acceptance.

While other work has focused on pharmacological treatments for behavioral issues associated with fragile X syndrome, Piomelli noted that this is the first to identify the role endocannabinoids play in the neurobiology of the condition.

Provided by University of California, Irvine

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