

Researchers report that the acute use of cannabinoids depresses motor neuron activity

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The researchers of the NeuroDegeneration and NeuroRepair Group of the University of Cadiz.

Why does the habitual marijuana user have difficulties speaking, breathing or swallowing food? Is it true that people who use marijuana may suffer acute lack of motor coordination? Does the use of cannabis cause muscular weakness? The answers to these and other similar questions are explored by the researchers of the NeuroDegeneration and



NeuroRepair Group of the University of Cadiz, directed by professor Bernardo Moreno, and who recently published a study related to this topic in the prestigious journal *Neuropharmacology*.

This study reveals that synthetic analogues of the psychoactive compounds of marijuana significantly reduce the activity of motor neurons. To fully understand the importance of this discovery, it is necessary to bear in mind that up until now there were no studies focusing on this subject. All the work known to date related to cannabis and its effects had been based on the psychomotor mechanisms (the higher central nervous system) and there was no study focused on describing the direct impact of cannabinoids on the motor neurons that control the muscles. Therefore, the researchers decided to work on this topic using the motor hypoglossal nucleus that controls the movements of the tongue as a model, given that "the tongue is an important muscle used in respiratory phenomena, including speech and swalling food.

Thus, "during the investigation, we used an animal model in which we studied the alterations produced by synthetic cannabinoids on the activity of the <u>motor neurons</u> of the hypoglossal nucleus. In doing so, we discovered that these psychoactive compounds inhibit the information that reaches these neurons via the synapses (structures specialized in the communication of information between neurons). In other words, cannabinoids hinder the transmission of information between neurons." One consequence of this fact is that muscular weakness is produced as "the motor neuron, that is the one that gives the order to the muscle to contract, sees its activity reduced which, as a consequence, would weaken the strength of the muscle contraction," says Moreno. All of this could lead to problems speaking, breathing and even swallowing food.

Nevertheless, this action mechanism could also explain the beneficial therapeutic effects that marijuana has on motor disturbances in people suffering from neurodegenerative diseases such as multiple sclerosis for



example, since "in pathological processes associated with muscular hyperactivity phenomena, the reduction in motor neuron activity induced by cannabis could lead to a symptomatological improvement."

This study, carried out after studies on synaptic mechanisms performed by this group at the University of Cadiz, opens a new avenue of research for the scientific community. In spite of this, "our work will be steered towards other territories. At this time, we are in the middle of a study focusing on the effects of <u>cannabinoids</u> as possible mediators of synaptic plasticity (phenomenon involved in motor learning), although it must be made clear that these compounds are not the central theme of the work of our research group," concludes Moreno.

More information: García Morales, Victoria; Montero, Fernando; Moreno López, Bernardo: "Cannabinoid agonists rearrange synaptic vesicles at excitatory synapses and depress motor-neuron activity in vivo". *Neuropharmacology*. (2015) <u>DOI:</u> <u>10.1016/j.neuropharm.2014.12.036</u>

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