

Cannabinoid 2 receptors regulate impulsive behavior

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Impulsivity is a personality trait characterized by behavioral actions that lack forethought or in which the subsequent consequences are not considered. Credit: European Parliament

A new study lead by the Neuroscience Institute of Alicante reveals how manipulating the endocannabinoid system can modulate high levels of impulsivity. This is the main problem in psychiatric illnesses such a schizophrenia, bipolar disorder and substance abuse.

Spanish researchers have for the first time proved that the CB2 receptor, which has modulating functions in the nervous system, is involved in regulating impulsive behaviour.

"Such a result proves the relevance that manipulation of the

[endocannabinoid system](#) can have in modulating high levels of impulsivity present in a wide range of psychiatric and [neurological illness](#)," explains SINC Jorge Manzanares Robles, a scientist at the Alicante Neuroscience Institute and director of the study.

Carried out on mice, the study suggests the possibility of undertaking future clinical trials using drugs that selectively act on the CB2 and thus avoid the psychoactive effects deriving from receptor CB1 manipulation, whose role in impulsivity has already been proven.

However, the authors of the study published in the *British Journal of Pharmacology* remain cautious. Francisco Navarrete, lead author of the study, states that "it is still very early to be able to put forward a reliable [therapeutic tool](#)."

The study assessed the actions of two cannabinoid drugs that stimulate and block CB2 in the mouse strain showing high levels of impulsivity. The scientists then analysed whether these drugs were capable of modulating impulsive behaviour and the cerebral modifications associated with this change in behaviour.

The authors concluded that CB2 receptor activity modulation reduced [impulsive behaviour](#) in mice, depending on the patterns that governed the administration of each drug. Furthermore, the [genetic expression](#) levels of CB2 tended to return to normal, leaning towards strains that had little impulsivity.

The Endocannabinoid System

The Endocannabinoid System mainly comprises two [receptors](#) (CB1 and CB2), two endogenous ligands and two metabolism enzymes. It regulates many aspects of embryonic development and is involved in many homeostatic mechanisms.

Although it was thought that CB2 only regulates immune response on a peripheral level, a study published in the *Science* journal in 2005 showed that it was found in the brain under normal conditions. Since then many authors have linked it to the regulation of emotional behaviour and cognitive functions.

For example, the same group of Spanish researchers has contributed greatly in applying this receptor in regulating anxiety and depression. Furthermore, others studies have demonstrated how their altered role is linked to increased chances of becoming depressed or anxious or taking drugs.

Virtue or defect?

Impulsivity is a personality trait characterised by behavioural actions that lack forethought or in which the subsequent consequences are not considered. The authors outline that this is "a normal behaviour that allows us as human beings to adapt to our surroundings under certain circumstances that require an immediate reaction."

Nonetheless, such behaviour can cause a disproportionate response and lead to a pathological state. There a multitude of psychiatric illness that are characterised by a high level of [impulsivity](#). One of these includes substance abuse, which is extremely problematic for society in general.

More information: Francisco Navarrete, José M.,Pérez-Ortiz y Jorge Manzanares. "Regulación de la conducta de tipo impulsivo mediada por el receptor cannabinoide CB2 en ratones DBA/2". *British Journal of Pharmacology* 165:260-273, Jan 2012.

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