

Title: The effects of Cannabidiol on reward processing: A systematic review.

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Abstract

Introduction: Cannabidiol (CBD) is being investigated as a potential treatment for reward dysfunction disorders, including addictions, depression and psychosis. CBD's therapeutic effects in these psychiatric disorders are potentially mediated by its effects on reward processing. This systematic review aimed to summarise the results of both animal and human studies on the effects of CBD on reward learning, anticipation and consumption.

Method:

Data source: Electronic searches on MEDLINE and PUBMED were performed with the following keywords in titles and/or abstracts: "cannabidiol", "reward", "striatum", "addiction", "dopamine", "NACC" and "depression". Reference lists of relevant articles were also examined.

Eligibility criteria: English language studies that evaluated the outcomes of CBD administration on at least one of the following: motivation, willingness or behavioural response to earn a reward; subjective, neural or physiological response to reward anticipation and/or reward delivery/feedback; or indices of reward learning. Rewarding stimuli (rewards) were defined as any kind of primary rewards and secondary rewards. Studies on humans and animals were included. All types of study designs were included: clinical and experimental trials (randomized or not), naturalistic, behavioural and neuroimaging studies.

Results: A total of 16 studies were included. 7 studies were included of those out of the 96 entries found on electronic databases, and 9 studies were added from reference lists. Included studies were 5 human studies and 11 animal studies. CBD consistently reduced the likelihood of relapse, recurrent drug-seeking behaviours and the magnitude of the rewarding feelings induced by addictive substances such as THC, cocaine and morphine, as well as drug-conditioned rewards in a dose-dependent manner, only when CBD is administered in the reinstatement stage or re-exposure stage. When administered in the reinforcement phase, CBD did not differ from vehicle or placebo in any subjective and behavioural measures.

Conclusions and Implications:

Results suggest that firstly, CBD attenuates both anticipatory and consummatory reward processing, and the motivation for reward-seeking in established rewards. It restored the over-sensitised reward processing induced by other addictive substances. Secondly, CBD plays little or no role in behavioural and subjective measures of reward learning during reinforcement. Altogether, included studies suggest that CBD weakens reward consumption by dampening the effects of rewards and reward motivation.