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

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Abstract

Introduction: Cannabidiol (CBD) isbeing investigated as a potential treatment for reward dysfunction disorders, includingaddictions, depression and psychosis. CBD's therapeutic effects in thesepsychiatric disorders are potentially mediated by its effects on rewardprocessing. This systematic review aimed to summarise the results of bothanimal and human studies on the effects of CBD on reward learning, anticipationand consumption.

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

Eligibilitycriteria: English language studiesthat evaluated the outcomes of CBD administration on at least one of thefollowing: motivation, willingness or behavioural response to earn areward; subjective, neural or physiological response to rewardanticipation and/or reward delivery/feedback; or indices of rewardlearning. Rewarding stimuli (rewards) were defined as any kind of primaryrewards and secondary rewards. Studies on humans and animals were included. Alltypes of study designs were included: clinicaland experimental trials (randomized or not), naturalistic,behavioural and neuroimaging studies.

Results: A total of 16studies were included. 7 studies were included of those out of the 96 entriesfound on electronic databases, and 9 studies were added from reference lists.Included studies were 5 human studies and 11 animal studies. CBD consistentlyreduced the likelihood of relapse, recurrent drug-seeking behaviours and themagnitude of the rewarding feelings induced by addictive substances such asTHC, cocaine and morphine, as well as drug-conditioned rewards in adose-dependent manner, only when CBD is administrated in the reinstatementstage or re-exposure stage. When administrated in the reinforcement phase, CBDdid not differ from vehicle or placebo in any subjective and behaviouralmeasures.

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.