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Chronic cannabidiol treatment improves social and object recognition in double transgenic APP^{swe}/PS1^{ΔE9} mice

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Abstract

Rationale: Patients suffering from Alzheimer's disease (AD) exhibit a decline in cognitive abilities including an inability to recognise familiar faces. Hallmark pathological changes in AD include the aggregation of amyloid- β (A β), tau protein hyperphosphorylation as well as pronounced neurodegeneration, neuroinflammation, neurotoxicity and oxidative damage.

Objectives: The non-psychoactive phytocannabinoid cannabidiol (CBD) exerts neuroprotective, anti-oxidant and anti-inflammatory effects and promotes neurogenesis. CBD also reverses A β -induced spatial memory deficits in rodents.

Materials and methods: Thus we determined the therapeutic-like effects of chronic CBD treatment (20 mg/kg, daily intraperitoneal injections for 3 weeks) on the APP^{swe}/PS1^{ΔE9} (APPxPS1) transgenic mouse model for AD in a number of cognitive tests, including the social preference test, the novel object recognition task and the fear conditioning paradigm. We also analysed the impact of CBD on anxiety behaviours in the elevated plus maze.

Results: Vehicle-treated APPxPS1 mice demonstrated impairments in social recognition and novel object recognition compared to wild type-like mice. Chronic CBD treatment reversed these cognitive deficits in APPxPS1 mice without affecting anxiety-related behaviours.

Conclusions: This is the first study to investigate the effect of chronic CBD treatment on cognition in an AD transgenic mouse model. Our findings suggest that CBD may have therapeutic potential for specific cognitive impairments associated with AD.

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