Front Pharmacol. 2017; 8: 81.

Published online 2017 Feb 24. doi: 10.3389/fphar.2017.00081

A Systematic Review and Meta-Analysis of the Haemodynamic Effects of Cannabidiol

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Abstract

Despite cannabidiol (CBD) having numerous cardiovascular effects *in vitro*, its haemodynamic effects *in vivo* are unclear. Nonetheless, the clinical use of CBD (Epidiolex) is becoming more widespread. The aim of this systematic review was to establish whether CBD is associated with changes in haemodynamics *in vivo*. Twenty-five studies that assessed the haemodynamic effects of CBD (from PubMed, Medline and EMBASE) were systematically reviewed and meta-analyzed. Data on blood pressure (BP), heart rate (HR), and blood flow (BF) were extracted and analyzed using random effects models. Twenty-two publications assessed BP and HR among 6 species (BP $n = 344$ and HR $n = 395$), and 5 publications assessed BF in 3 species ($n = 56$) after acute dosing of CBD. Chronic dosing was assessed in 4 publications in 3 species (total subjects BP, $n = 6$; HR, $n = 27$; BF, $n = 3$). Acute CBD dosing had no effect on BP or HR under control conditions. Similarly, chronic dosing with CBD had no effect on HR. In models of stress, acute CBD administration significantly reduced the increase in BP and HR induced by stress (BP, mean difference (MD) −3.54, 95% CI −5.19, −1.9, $p < 0.0001$; HR, MD −16.23, 95% CI −26.44, −6.02, $p = 0.002$). In mouse models of stroke, CBD significantly increased cerebral blood flow (CBF, standardized mean difference (SMD) 1.62, 95% CI 0.41, 2.83, $p = 0.009$). Heterogeneity among the studies was present, there was no publication bias except in HR of control and stressful conditions after acute CBD dosing, and median study quality was 5 out of 9 (ranging from 1 to 8). From the limited data available, we conclude that acute and chronic administration of CBD had no effect on BP or HR under control conditions, but reduces BP and HR in stressful conditions, and increases cerebral blood flow (CBF) in mouse models of stroke. Further studies are required to fully understand the potential haemodynamic effects of CBD in humans under normal and pathological conditions.