Experimental cannabidiol treatment reduces early pancreatic inflammation in type 1 diabetes

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Abstract: BACKGROUND: Destruction of the insulin-producing beta cells in type 1 diabetes (T1D) is induced by invasion of immune cells causing pancreatic inflammation. Cannabidiol (CBD), a phytocannabinoid, derived from the plant, Cannabis sativa, was shown to lower the incidence of diabetes in non-obese diabetic (NOD) mice, an animal model of spontaneous T1D development. OBJECTIVE: The goal of this study was to investigate the impact of experimental CBD treatment on early pancreatic inflammation in T1D by intravital microscopy (IVM) in NOD mice. METHODS: Seven-week-old female NOD mice were prophylactically administered daily 5 mg/kg CBD or control vehicle i.p. five times weekly for ten weeks. Animals underwent IVM following confirmation of T1D diagnosis by blood glucose testing. Leukocyte activation and functional capillary density (FCD) were quantified via IVM. RESULTS: CBD-treated NOD mice developed T1D later and showed significantly reduced leukocyte activation and increased FCD in the pancreatic microcirculation. CONCLUSIONS: Experimental CBD treatment reduced markers of inflammation in the microcirculation of the pancreas studied by intravital microscopy.

Keywords: Type 1 diabetes, inflammation, intravital microscopy, leukocyte adherence, functional capillary density, cytokines, adhesion molecules

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