Cannabidiol, a safe and non-psychotropic ingredient of the marijuana plant *Cannabis sativa*, is protective in a murine model of colitis

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Abstract

Inflammatory bowel disease affects millions of individuals; nevertheless, pharmacological treatment is disappointingly unsatisfactory. Cannabidiol, a safe and non-psychotropic ingredient of marijuana, exerts pharmacological effects (e.g., antioxidant) and mechanisms (e.g., inhibition of endocannabinoids enzymatic degradation) potentially beneficial for the inflamed gut. Thus, we investigated the effect

of cannabidiol in a murine model of colitis. Colitis was induced in mice by intracolonic administration of dinitrobenzene sulfonic acid. Inflammation was assessed both macroscopically and histologically. In the inflamed colon, cyclooxygenase-2 and inducible nitric oxide synthase (iNOS) were evaluated by Western blot, interleukin-1β and interleukin-10 by ELISA, and endocannabinoids by isotope dilution liquid chromatography–mass spectrometry. Human colon adenocarcinoma (Caco-2) cells were used to evaluate the effect of cannabidiol on oxidative stress. Cannabidiol reduced colon injury, inducible iNOS (but not cyclooxygenase-2) expression, and interleukin-1β, interleukin-10, and endocannabinoid changes associated with 2,4,6-dinitrobenzene sulfonic acid administration. In Caco-2 cells, cannabidiol reduced reactive oxygen species production and lipid peroxidation. In conclusion, cannabidiol, a likely safe compound, prevents experimental colitis in mice.

Keywords

Cannabinoids Colitis Inflammatory bowel disease Gastroenterology

Abbreviations

2-AG

2-Arachydonylglycerol

CBD

Cannabidiol

COX-2

Cyclooxygenase-2

DMEM

Dulbecco's modified Eagle’s medium

DNBS

2,4,6-Dinitrobenzene sulfonic acid

ELISA

Enzyme-linked immunosorbent assay

FAAH

Fatty acid amide hydrolase

FBS

Fetal bovine serum

iNOS

Inducible nitric oxide synthase

H2DCF-DA

2′,7′-Dichlorfluorescein-diacetate

IL-1β

Interleukin-1β

IL-10

Interleukin 10

MDA

Malondialdehyde

MTT

3-(4,5-Dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide

PBS

Phosphate-buffered saline

ROS

Reactive oxygen species

TBA

Thiobarbituric acid

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Notes

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