



Review

Plant-derived natural therapeutics targeting cannabinoid receptors in metabolic syndrome and its complications: A review

Ashwani S. Patil^a, Umesh B. Mahajan^a, Yogeta O. Agrawal^b, Kalpesh R. Patil^a, Chandragouda R. Patil^a, Shreshth Ojha^c, Charu Sharma^d, Sameer N. Goyal^{a,e,*}

^a Department of Pharmacology, R. C. Patel Institute of Pharmaceutical Education and Research, Shirpur, 425405, Dhule, Maharashtra, India

^b Department of Pharmaceutics, R. C. Patel Institute of Pharmaceutical Education and Research, Shirpur, Dhule, Maharashtra, 425405, India

^c Department of Internal Medicine, College of Medicine and Health Sciences, United Arab Emirates University, Al Ain 17666, UAE

^d Department of Internal Medicine, College of Medicine and Health Sciences, United Arab Emirates University, Al Ain 17666, UAE

^e SVKM's Institute of Pharmacy, Dhule, Maharashtra, 424 001, India



ARTICLE INFO

Keywords:

Endocannabinoids
Metabolic syndrome
Cannabinoid receptors
Plant-derived cannabinoids

ABSTRACT

The endocannabinoid system (ECS) is natural physiological system in the humans. The presence of the ECS system involves different roles in body. The endocannabinoid system involves regulation of most of the centers, which regulates the hunger and leads to changes in the weight. In the present article, we reviewed the role of natural cannabinoid compounds in metabolic disorders and related complications. We studied variety of a plant-derived cannabinoids in treating the metabolic syndrome including stoutness, fatty acid liver diseases, insulin obstruction, dementia, hypertension, lipid abnormalities, non-alcoholic steatohepatitis, endothelial damage, and polycystic ovarian syndrome and so on. The activation of cannabinoid receptors demonstrates a significant number of beneficial approaches concerning metabolic syndrome and reduces the pro-inflammatory cytokines on account of aggravation, decreased oxidative stress and uneasiness, diminishes liver fibrosis, with reduces adiponectin. Pre-clinical investigations of plant-derived cannabinoids resulted in promising outcomes. The different distinctive plant-derived cannabinoids were discovered like cannabidiol (CBD), cannabinol (CBN), cannabichromene (CBC), and cannabidiol (CBG). It has been observed that endogenous cannabinoids and plant-derived cannabinoids have an advantageous impact on limiting the metabolic disorder arising due to lifestyle changes.

1. Introduction

ECS is known to be the natural physiological system in the human body. ECS plays many roles in the body, it increases the brain centers for hunger and body weight, hence can be liable for abnormalities and increases the chances of physiological changes in the body. It has been suggested that overexpression of ECS leads to the occurrence of metabolic syndrome [1]. This system includes G-protein coupled receptors called cannabinoid receptor 1 (CB1), cannabinoid receptor 2 (CB2). The endocannabinoids and their receptors are found in almost all the body organs, fluids and tissue, from which anandamide and 2-arachidonoylglycerol are well known [2]. CB1 was first found in the brain afterwards it was suggested to be in the olfactory bulb, hippocampus, septum, amygdala, hypothalamus and cerebellum [3]. Recent studies have shown that the ECS is involved in many diseases and disorders, the

hyperactivity of endocannabinoids in the body results in depression, anxiety and post-traumatic disorders [4]. The reports showed that ECS works as epigenetic modulators activating the transcriptional action of key genes involved in neurotransmissions [5]. Metabolic syndrome has different physiological factors that increases the risk of cardiovascular disease, and type 2 diabetes mellitus. The prevalence of the metabolic syndrome in USA is, 34 % and 9.3 % of adults with diabetes mellitus. Also, metabolic syndrome is linked to a number of cancers, including breast, pancreatic, colon and liver cancer. Earlier review gathers internationally generated information on metabolic syndrome, its many definitions and its associations with life-threatening situations, including type 2 diabetes mellitus, cardiovascular disease, and cancer [7]. The two major components of metabolic syndrome are weight gain and fat accumulation at intra-abdominal sites with abnormal fat in the liver, pancreas, and heart. Psychosocial stress and our lifestyle also

* Corresponding author at: Department of Pharmacology, R. C. Patel Institute of Pharmaceutical Education and Research, Shirpur, and SVKM's Institute of Pharmacy, Dhule, 424 001, Dist: Dhule, Maharashtra, India.

E-mail address: goyal.aiims@gmail.com (S.N. Goyal).

<https://doi.org/10.1016/j.bioph.2020.110889>

Received 30 May 2020; Received in revised form 9 October 2020; Accepted 12 October 2020

Available online 28 October 2020

0753-3322/© 2020 Published by Elsevier Masson SAS. This is an open access article under the CC BY-NC-ND license

(<http://creativecommons.org/licenses/by-nc-nd/4.0/>).



The power of the Web of Science™ on your mobile device, wherever inspiration strikes.

Dismiss

Learn More

Already have a manuscript?

Use our Manuscript Matcher to find the best relevant journals!

Find a Match

Refine Your Search Results

Biomedicine & Pharmacotherapy

Search

Sort By: Relevancy

Search Results

Found 56 results (Page 1)

Share These Results

Filters

Clear All

Web of Science Coverage

Open Access

Category

Country / Region

Exact Match Found

BIOMEDICINE & PHARMACOTHERAPY

OPEN ACCESS

Publisher: ELSEVIER FRANCE-EDITIONS SCIENTIFIQUES MEDICALES ELSEVIER, 65 RUE CAMILLE DESMOULINS, CS50083, ISSY-LES-MOULINEAUX, FRANCE, 92442

ISSN / eISSN: 0753-3322 / 1950-6007

Web of Science Core Collection: Science Citation Index Expanded

Additional Web of Science Indexes: Biological Abstracts | BIOSIS Previews | Current Contents Life Sciences | Essential Science Indicators

