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Review

A focused review on CB2 receptor-selective pharmacological properties and therapeutic potential of β-caryophyllene, a dietary cannabinoid

Hebaallah Mamdouh Hashiesh [a], Charu Sharma [b], Sameer N. Goyal [c], Bassem Sadek [a], Niraj Kumar Jha [d], Juma Al Kaabi [b], Shreesh Ojha [a,e,*]

[a] Department of Pharmacology and Therapeutics, College of Medicine and Health Sciences, United Arab Emirates University, P.O. Box 17666, Al Ain, United Arab Emirates
[b] Department of Internal Medicine, College of Medicine and Health Sciences, United Arab Emirates University, P.O. Box 17666, Al Ain, United Arab Emirates
[c] Shri Vile Parle Kelvani Mandal's Institute of Pharmacy, Dhule 424001, Maharashtra, India
[d] Department of Biotechnology, School of Engineering & Technology, Sharda University, Greater Noida, Uttar Pradesh 201310, India
[e] Zayed Bin Sultan Al Nahyan Center for Health Sciences, United Arab Emirates University, P.O. Box 17666, Al Ain, United Arab Emirates

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ABSTRACT

The endocannabinoid system (ECS), a conserved physiological system emerged as a novel pharmacological target for its significant role and potential therapeutic benefits ranging from neurological diseases to cancer. Among both, CB1 and CB2R types, CB2R have received attention for its pharmacological effects as antioxidant, anti-inflammatory, immunomodulatory and antiapoptotic that can be achieved without causing psychotropic adverse effects through CB1R. The ligands activate CB2R are of endogenous, synthetic and plant origin. In recent years, β-caryophyllene (BCP), a natural bicyclic sesquiterpene in cannabis as well as non-cannabis plants, has received attention due to its selective agonist property on CB2R. BCP has been well studied in a variety of pathological conditions mediating CB2R selective agonist property. The focus of the present manuscript is to represent the CB2R selective agonist mediated pharmacological mechanisms and therapeutic potential of BCP. The present narrative review summarizes insights into the CB2R-selective pharmacological properties and therapeutic potential of BCP such as cardioprotective, hepatoprotective, neuroprotective, nephroprotective, gastroprotective, chemopreventive, antioxidant, anti-inflammatory, and immunomodulator. The available evidences suggest that BCP, can be an important candidate of plant origin endowed with CB2R selective properties that may provide a pharmacological rationale for its pharmacotherapeutic application and pharmaceutical development like a drug. Additionally, given the wide availability in edible plants and dietary use, with safety, and no toxicity, BCP can be promoted as a nutraceutical and functional food for general health and well-being. Further, studies are needed to explore pharmacological and pharmaceutical opportunities for therapeutic and preventive applications of use of BCP in human diseases.

1. Introduction

The endocannabinoid system (ECS) has a myriad of physiological functions and contributes to the pathogenesis of many diseases, signifying broad therapeutic potential of targeted ECS modulators [1]. ECS consists of endogenous endocannabinoids, cannabinoid (CB) (mainly CB1 and CB2) receptors, and enzymes required for synthesizing and degrading endogenous CBs [2]. Each of these components is considered a potential target for drug discovery and development. Among both, CB1 and CB2 receptor types, pharmacological activation of CB2 receptors (CB2Rs) have received attention for its pharmacological effects as antioxidant, anti-inflammatory, immunomodulatory and antiapoptotic that can be achieved without causing psychotropic adverse effects through CB1 receptors (CB1Rs) [3]. The clinical development of ligands that directly stimulate CB1R has been limited by undesired psychotropic effects [4]. However, the activation of CB2R produces therapeutic responses devoid of psychotropic side effects [5]. Therefore, CB2R activation by pharmacological agonists has received increased attention in both academia and the pharmaceutical industries [6,7].

Substantial efforts have been made for developing ligands for CB1

* Corresponding author at: Department of Pharmacology and Therapeutics, College of Medicine and Health Sciences, United Arab Emirates University, P.O. Box 17666, Al Ain, United Arab Emirates.
E-mail address: shreeshojha@uaeu.ac.ae (S. Ojha).

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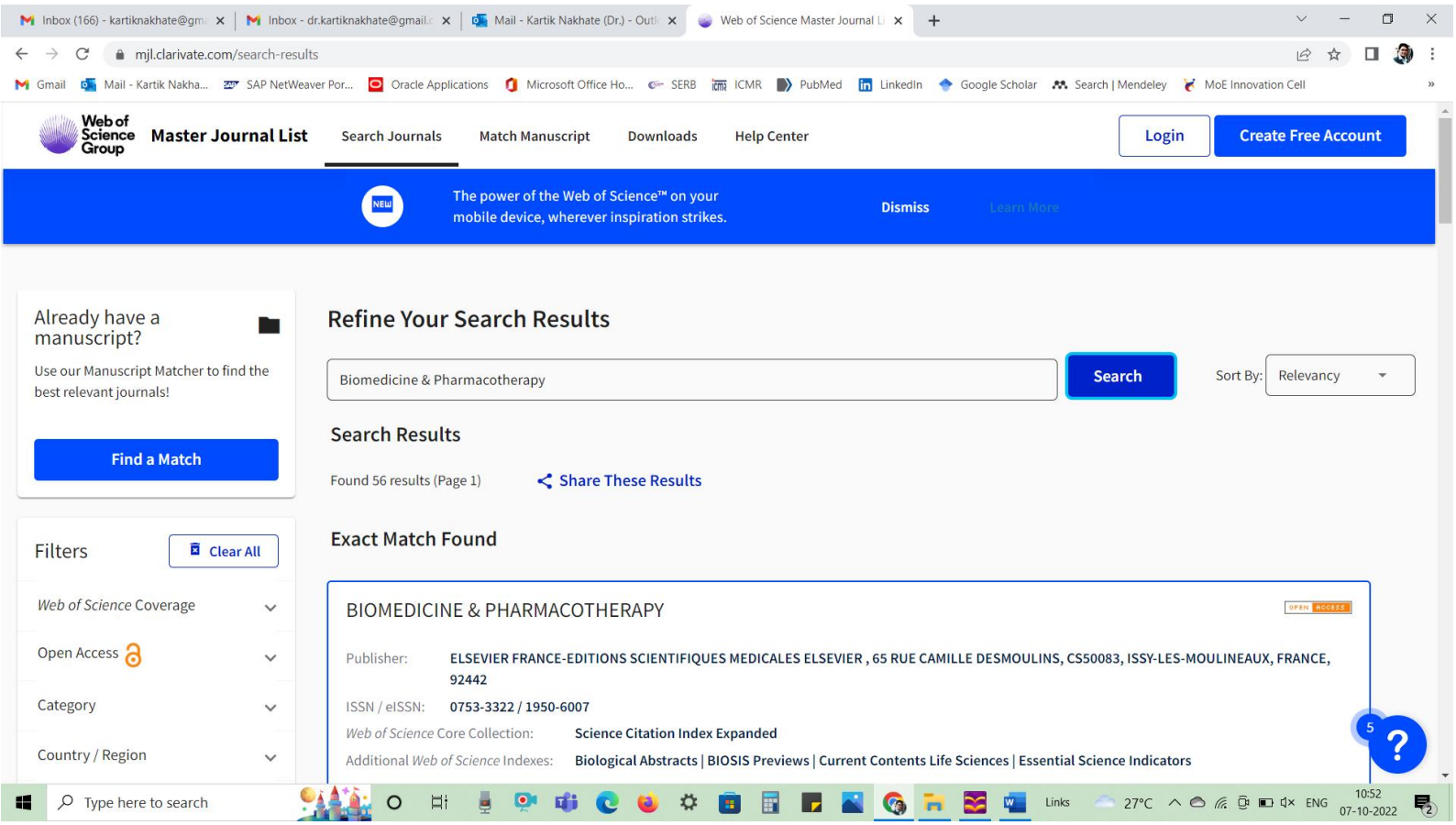
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