



Pharmacological Properties, Therapeutic Potential and Molecular Mechanisms of JWH133, a CB2 Receptor-Selective Agonist

Hebaallah Mamdouh Hashiesh¹, Charu Sharma², Sameer N. Goyal³, Niraj Kumar Jha⁴ and Shreesh Ojha^{1,5*}

¹Department of Pharmacology and Therapeutics, College of Medicine and Health Sciences, United Arab Emirates University, Al Ain, United Arab Emirates, ²Department of Internal Medicine, College of Medicine and Health Sciences, United Arab Emirates University, Al Ain, United Arab Emirates, ³Shri Vile Parle Kelavani Mandal's Institute of Pharmacy, Dhule, India, ⁴Department of Biotechnology, School of Engineering and Technology (SET), Sharda University, Greater Noida, India, ⁵Zayed Bin Sultan Center for Health Sciences, United Arab Emirates University, Al Ain, United Arab Emirates

OPEN ACCESS

Edited by:

Melha Karsak,
University Medical Center Hamburg-
Eppendorf, Germany

Reviewed by:

Paula Morales,
Instituto de Química Médica (IQM),
Spain
Sabatino Maione,
University of Campania Luigi Vanvitelli,
Italy

*Correspondence:

Shreesh Ojha
shreeshojha@uaeu.ac.ae

Specialty section:

This article was submitted to
Experimental Pharmacology and Drug
Discovery,
a section of the journal
Frontiers in Pharmacology

Received: 29 April 2021

Accepted: 02 July 2021

Published: 30 July 2021

Citation:

Hashiesh HM, Sharma C, Goyal SN,
Jha NK and Ojha S (2021)
Pharmacological Properties,
Therapeutic Potential and Molecular
Mechanisms of JWH133, a
CB2 Receptor-Selective Agonist.
Front. Pharmacol. 12:702675.
doi: 10.3389/fphar.2021.702675


The endocannabinoid system has attracted attention as a pharmacological target for several pathological conditions. Cannabinoid (CB2)-selective agonists have been the focus of pharmacological studies because modulation of the CB2 receptor (CB2R) can be useful in the treatment of pain, inflammation, arthritis, addiction, and cancer among other possible therapeutic applications while circumventing CNS-related adverse effects. Increasing number of evidences from different independent preclinical studies have suggested new perspectives on the involvement of CB2R signaling in inflammation, infection and immunity, thus play important role in cancer, cardiovascular, renal, hepatic and metabolic diseases. JWH133 is a synthetic agonist with high CB2R selectivity and showed to exert CB2R mediated antioxidant, anti-inflammatory, anticancer, cardioprotective, hepatoprotective, gastroprotective, nephroprotective, and immunomodulatory activities. Cumulative evidences suggest that JWH133 protects against hepatic injury, renal injury, cardiotoxicity, fibrosis, rheumatoid arthritis, and cancer as well as against oxidative damage and inflammation, inhibits fibrosis and apoptosis, and acts as an immunosuppressant. This review provides a comprehensive overview of the polypharmacological properties and therapeutic potential of JWH133. This review also presents molecular mechanism and signaling pathways of JWH133 under various pathological conditions except neurological diseases. Based on the available data, this review proposes the possibilities of developing JWH133 as a promising therapeutic agent; however, further safety and toxicity studies in preclinical studies and clinical trials in humans are warranted.

Keywords: cannabinoid receptor agonist, cannabinoids, JWH133, synthetic cannabinoids, cannabinoid agonists

INTRODUCTION

The endocannabinoid system comprises cannabinoid receptors (CB1R and CB2R), which play pivotal roles in various human biological and pathological conditions. Substantial effort has been focused on developing ligands for CB1R and CB2R, leading to hundreds of phyto- and synthetic cannabinoids with variable affinities linked to the treatment of several disorders (An et al., 2020). The

NEW 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

Frontiers in Pharmacology [Search](#) Sort By: Relevancy

Search Results

Found 648 results (Page 1) [Share These Results](#)

Filters [Clear All](#)

- Web of Science Coverage
- Open Access
- Category
- Country / Region

Exact Match Found

FRONTIERS IN PHARMACOLOGY [OPEN ACCESS](#)

Publisher: **FRONTIERS MEDIA SA, AVENUE DU TRIBUNAL FEDERAL 34, LAUSANNE, SWITZERLAND, CH-1015**

ISSN / eISSN: **1663-9812**

Web of Science Core Collection: **Science Citation Index Expanded**

Additional Web of Science Indexes: **Biological Abstracts | BIOSIS Previews | Current Contents Clinical Medicine | Essential Science Indicators**