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A systematic review on the neuroprotective perspectives of beta-caryophyllene

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Abstract

Beta (β)-caryophyllene (BCAR) is a major sesquiterpene of various plant essential oils reported for several important pharmacological activities, including antioxidant, anti-inflammatory, anticancer, cardioprotective, hepatoprotective, gastroprotective, nephroprotective, antimicrobial, and immune-modulatory activity. Recent studies suggest that it also possesses neuroprotective effect. This study reviews published reports pertaining to the neuropharmacological activities of BCAR. Databases such as PubMed, Scopus, MedLine Plus, and Google Scholar with keywords "beta (β)-caryophyllene" and other neurological keywords were searched. Data were extracted by referring to articles with information about the dose or concentration/route of administration, test system, results and discussion, and proposed mechanism of action. A total of 545 research articles were recorded, and 41 experimental studies were included in this review, after application of exclusion criterion. Search results suggest that BCAR exhibits a protective role in a number of nervous system-related disorders including pain, anxiety, spasm, convulsion, depression, alcoholism, and Alzheimer's disease. Additionally, BCAR has local anesthetic-like activity, which could protect the nervous system from oxidative stress and inflammation and can act as an immunomodulatory agent. Most neurological activities of this natural product have been linked with the cannabinoid receptors (CBRs), especially the CB2R. This review suggests a possible application of BCAR as a neuroprotective agent.

Keywords: anti-inflammatory; antioxidant; neuro-protection; phytocannabinoid.

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