



Research Summary

# MILITARY FITNESS & BETA-CARYOPHYLLENE

Potential Applications of Endocannabinoid Treatment  
Modalities



Presented by retired Colonel (Dr.) Philip Blair

## Research Overview

Soldiers and competitive athletes must maintain extremely high levels of physical and mental fitness for best performance and survival. Physical stress needs to be managed to achieve optimum improvements while avoiding injury or significant inflammation impairment. In addition, neurologic function must be optimized for mental and visual focus, anxiety, sleep, and mood. Beta-Caryophyllene (BCP) appears to meet this broad-spectrum demand without adverse effects.

BCP activates the endocannabinoid type 2 receptor (CB2R) which regulates every immune cell in the body. It also activates other receptors throughout the body that regulate pain and metabolism. BCP has shown improvements in studies of neurodegenerative conditions like Parkinson, Alzheimer's, and stroke. And experiments indicate potential protection against atherosclerosis and heart attacks. Many find a calming effect and improvement in sleep as well. In addition, there is some evidence for BCP antiviral activity against COVID-19.

BCPlus is a natural extract of beta-Caryophyllene (BCP). BCP is found in many nutritious herbs such as black pepper, cloves, and hemp. FDA has approved Beta-Caryophyllene as a safe food additive and flavoring agent. BCPlus liposomal is tasty, water soluble and extremely bioavailable in concentrations of 30mg/mL with usual servings of 1/2mL twice daily. It is effective in adults and children with no significant side effects and offered in full and sample sizes at <http://blairmedicalgroup.com>

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**Muscle.** Beta-Caryophyllene dramatically reduced delayed-onset-muscle-soreness from strenuous exercise that causes swelling of muscles, tenderness, rigidity, pain, disruption of muscle fiber, alteration in the kinematics of joint, acute tissue damage, and reduction in power and strength. In addition, BCP improved the isometric flexion strength and shows a positive trend in increasing the muscle flexibility.

**Preparation and Characterization of Liposomal  $\beta$ -Caryophyllene (Rephyll) on Delayed Onset Muscle Soreness in Humans. 2020. <https://dx.doi.org/10.1021/acsomega.0c03456>**

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**Pain:** BCP is able to produce both acute and prolonged antinociceptive and chondroprotective effects as well as inhibiting cartilage degeneration without producing tolerance for the analgesic effects. Antinociceptive and chondroprotective effects of prolonged  $\beta$ -caryophyllene treatment in the animal model of osteoarthritis.

**doi: 10.1016/j.neuropharm.2021.108908. In addition, BCP activates opioid & endorphin receptors, synergies with opioid analgesics, and inhibits the Th1 immune response that plays a critical role in neuro-inflammation, sensitization, and pain.**

**Cannabinoids for neuropathic pain. PMID: 25160710. DOI: 10.1007/s11916-014-0451-2.**

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**Energy & metabolism.** Beta-Caryophyllene significantly enhances glucose uptake, glycolytic and oxidative pathways, and ATP synthesis through a CB2-dependent mechanism thereby improving skeletal muscle glucose metabolism, energy, and recovery in physiological and pathological conditions.

**$\beta$ -Caryophyllene Boosts Glucose Metabolism and ATP Synthesis in Skeletal Muscle Cells through Cannabinoid Type 2 Receptor Stimulation. Nutrients. 2021. Doi: 10.3390/nu13030916**

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**Sleep.** Beta-caryophyllene decreases the latency and increased the sleep time and shows anxiolytic-like effects without altering motor coordination probably involving CB2 signaling that is involved in the regulation of emotional behaviors.

**The anxiolytic-like effect of an essential oil derived from *Spiranthera odoratissima* and its major component,  $\beta$ -caryophyllene. 2012. PMID: 22542869  
DOI: 10.1016/j.pnpbp.2012.04.012**

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**Eyesight.** Vision is a vital capacity of soldiers both in daylight and darkness. BCP enhances vision and reverses eye diseases. Anecdotal reports show that Jamaican and fishermen smoke cannabis to improve dim light vision and improve visual perception. CB2R modulates visual acuity and retinal sensitivity for which BCP is also a strong agonist.

**Cannabinoids affect the mouse visual acuity via the CB2R. 2020.**

<https://doi.org/10.1038/s41598-020-72553-y>

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**Joints.** Beta-Caryophyllene regulated collagen antibody induced arthritis by reduced relevant pro-inflammatory cytokines and increased anti-inflammatory cytokine IL-13. Arthritic joints reverted to normal following BCP showing reduced inflammation markers in human articular chondrocytes.

**$\beta$ -Caryophyllene Mitigates Collagen Antibody Induced Arthritis Through a Crosstalk between CB2 and PPAR- $\gamma$  Receptors. 2019.**

<https://pubmed.ncbi.nlm.nih.gov/31370242/>

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**Wounds.** Furthermore,  $\beta$ -caryophyllene induced macroscopic retraction of the wounds treated with antioxidant and anti-inflammatory mechanisms of with increasing levels of IL-10 and GPx showed enhanced re-epithelialization, remodeling mechanism, increasing the collagen content.

**Beta-caryophyllene as an antioxidant, anti-inflammatory and re-epithelialization activities in a rat skin wound excision model. DOI:**

10.1155/2022/9004014

**Inflammation.** Beta-Caryophyllene reduces pro-inflammatory mediators thus ameliorating chronic pathologies characterized by inflammation and oxidative stress, particular in metabolic and neurological diseases. BCP has beneficial effects on obesity, non-alcoholic fatty liver disease/nonalcoholic steatohepatitis liver diseases, diabetes, cardiovascular diseases, pain, and other nervous system disorders.

**Chronic Inflammation: Protective Effects of (E)- $\beta$ -Caryophyllene (BCP) in Chronic Inflammation. 2020. Doi: 10.3390/ nu12113273.**

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**Swelling.** Beta-Caryophyllene inhibits of histamine-triggered edema and inflammation equal to oral dexamethasone. And BCP is more potent than most experimental CB2R agonists. FDA approved dietary source.

**Caryophyllene Is a Dietary Cannabinoid. Proc. Natl. Acad. Sci. USA. 2008; Doi: 10.1073/pnas.0803601105.**

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**Cardiovascular.** Beta-Caryophyllene serves as a protective function for heart and vascular systems.  $\beta$ -caryophyllene significantly reversed the infarcted size, ECG and BP alterations, ameliorated the elevations in cardiac stress parameters with a substantial reduction in inflammatory mediator levels. This study revealed the cardioprotective effect of  $\beta$ -caryophyllene against all heart diseases.

**BCP as a Potential Protective Agent Against Myocardial Injury: The Role of Toll-Like Receptors. Molecules. 2019. Doi: 10.3390/ molecules24101929**

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**Infection by COVID.** Beta-Caryophyllene has unique functional receptor selectivity, wide availability and accessibility, dietary bioavailability,

nonpsychoactivity, and negligible toxicity along with druggable properties, including favorable pharmacokinetic and physicochemical properties.

**$\beta$ -Caryophyllene, a Candidate to Target the Trinity of Infection, Immunity, and Inflammation in COVID-19. PMID: 34054510 DOI: 10.3389/fphar.2021.590201**

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**Trauma.** Traumatic brain injury is a common entity in the military and includes blast and concussion injuries for which BCP has therapeutic potential in prevention and treatment. BCP pre-treatment reduced oxidative stress damage and inflammatory cytokines that induce BBB breakdown, resulting in reduced neuronal apoptosis.

**Beta-Caryophyllene protects in vitro neurovascular unit against oxygen-glucose deprivation and re-oxygenation-induced injury. 2016 PMID: 27565895 DOI: 10.1111/jnc.13833.**

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**System Protective.** Beta-Caryophyllene offers a wide range of protective and therapeutic potential such as cardioprotective, hepatoprotective, neuroprotective, nephroprotective, gastroprotective, chemopreventive, antioxidant, anti-inflammatory, and immunomodulator. Additionally, given the wide availability in dietary use, with safety, and no toxicity, BCP can be promoted as a nutraceutical and functional food for general health and well-being.

**Phytocannabinoid: A focused review on  $\beta$ -caryophyllene, a dietary cannabinoid. 2021.PMID: 34091179. Doi: 10.1016/j.biopha.2021.111639.**

## ABOUT DR. PHILIP BLAIR

Retired Colonel (Dr.) Philip Blair is a board-certified Family Physician licensed in Washington State. He graduated from West Point in 1972 and attended University of Miami School of Medicine and trained as a family physician. He had assignments in Georgia, Louisiana, Washington, Oklahoma, Texas, Hawaii, Kansas, Italy, Korea, Germany, and the Gulf War.

After retiring from the Army in 1996 he managed workers injuries and provided primary care above the Arctic Circle in Alaska. He also provided services in Kodiak Island and Newfoundland, Canada.

In 2000 he became Vice President for Disease Management at AWAC, Inc., a medical management company, where he co-developed a highly successful interventional approach to chronic kidney disease. In 2011 he formed his own company consulting for employer-based health insurers and providing a revolutionary style of chronic disease management achieving success in over 75% of patients with diabetes, kidney disease, heart disease and metabolic syndrome. Now, he is developing products to support health.

Research summaries courtesy of Dr. Philip Blair

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## ABOUT BLAIR MEDICAL GROUP

Dr. Philip Blair has been providing healthcare consulting as the "AbleDoc" for years.

When Blair Medical Group developed our 'AbleDoc's Apothecary' product line, we wanted to convey the trust and familiarity of the corner drugstore/apothecary, where the pharmacist knew everyone by name, and personally cared about their health. Blair Medical Group and our "AbleDoc's Apothecary" brand is proud to build on this community tradition.

We are dedicated to supporting our partners and healthcare communities around the world. We follow our core values in all aspects of our work:

Integrity – Compassion – Reliability – Quality – Commitment

Our vision is to make our nutritional supplements, products, and programs universally accessible, creating a healthier, revitalized world for everyone.

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