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Short Communication

Biochanin A (BCA) and Metabolic Disorders: A Framework of Situation

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Biochanin A (BCA) is an isoflavone and it's a natural organic component that belongs to the flavonoids class of phytochemicals. Red clover, soy, alfalfa sprouts, peanuts, chickpea (Cicer arietinum), and other legumes all contain BCA [1]. By binding DNA and some proteins or functioning as a competitive substrates for some proteins, BCA plays a complicated central role in the regulation of different biochemical [2]. Genistein (GEN), a well-studied isoflavone, has a methylation precursor called BCA [3]. BCA is converted to its demethylated form in the gut by intestinal bacteria [4]. The molecular processes of BCA, however, are not analogous to those of GEN *in vitro* or *in vivo*. BCA has been used for a range of purposes, including treating estrogen shortage and pain, and lowering the degree of nerve injury, as a result of its different supposed biologically active components, such as antioxidant, anti-inflammatory, anti-infective, and anticarcinogenic activities [5]. Since of its probable impacts on human health and it is also relatively harmless, this plant extract is now widely available [6]. Isoflavones, particularly BCA, can be found in a range of medicinal compositions [7].

In type 2 diabetes, BCA has an *in vivo* effect on autophagy, differentiation, inflammation, and metabolic pathways, and is well-known for its role in blood glucose control [8]. By boosting cholesterol efflux and preventing cholesterol ester transfer, BCA lowers levels of cholesterol. Elevations in superoxide dismutase (SOD) and nitric oxide (NO) activity, decreases in malondialdehyde (MDA) and Bax levels, and increases in Hsp70 expression are all indications of BCA's gastroprotective effects [9]. Ovariectomy causes a significant rise in body weight as well as a decrease in femoral bone mineral density and trabecular bone, both of which are common side effects of 17-estradiol (E2) therapy [10].

By enhancing osteoblast activity and lowering osteoclast activity, BCA therapy can successfully prevent ovariectomy-induced increases in bone loss and turnover. BCA has an impact on all stages of bone formation, including osteoblast proliferation, differentiation, and mineralization [11]. Endothelial NO synthase (eNOS) and the release of NO, which is both vasodilatory and vasoprotective, have been observed to be stimulated by BCA [12].

Treatment and prevention of osteoarthritis may both benefit from BCA. BCA is well-known for its anti-diabetic and hypolipidemic effects. It has a hypolipidemic effect when the peroxisome proliferator-activated receptor (PPAR) in the liver is activated [13]. BCA causes weight loss, higher liver glycogen, and lower blood glucose levels by increasing circulating insulin levels and improving insulin sensitivity [14]. BCA acts as a protective factor in diabetic rats' cells. BCA regulates lipid and glucose metabolism in obese rats, which helps to diminish hepatic steatosis and insulin resistance [15].

Because BCA is an excellent inhibitor of insulin and hemoglobin glycosylation and has anti-inflammatory properties, it can help prevent diabetes issues. Fatty acid amide hydrolase is inhibited by BCA, suggesting that it could be utilized as a new painkiller. Due to its tyrosinase inhibitory activity, BCA has been demonstrated to suppress melanogenesis *in vitro* and *in vivo* and could be a promising option as a skin-whitening agent for the treatment of skin hyperpigmentation diseases. Therefore, BCA has the potential to be employed to treat a variety of metabolic illnesses.

Disclosure Statement

The author declare that there are no conflicts of interest.

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