Genistein is an isoflavone and phytoestrogen that was originally found in Genista but has since been found in many other plant sources, including soy. Genistein exhibits anti-resorptive, anti-osteoporotic, antioxidative, anti-obesity, anti-diabetic, anti-hyperlipidemic, neuroprotective, anti-inflammatory, anticancer, and anti-metastatic activities. Genistein inhibits osteoclast formation in macrophages and induces phase II enzymes such as superoxide dismutase, heme oxygenase 1 (HO-1) and Nrf2 in other cellular models. In high fat diet fed animal models, genistein decreases body weight, liver weight, lipid levels, and insulin dysregulation by inhibiting S6K1 signaling. In animal models of cerebral occlusion, genistein decreases infarct volume and neuronal apoptosis, increases activation of ERK1/2, and improves neurological and survival outcomes. In cellular models of Alzheimer’s disease, genistein increases PKC signaling and inhibits amyloid-β (Aβ)-induced neurotoxicity. In other cellular models, this compound decreases activation of NF-κB and expression of IL-1β, IL-6, and IL-8 in an AMPK-dependent manner. In colon cancer cells, genistein induces G2/M phase cell cycle arrest and apoptosis, decreases the mitochondrial membrane potential, and inhibits cellular proliferation. In hepatocellular carcinoma cells, genistein decreases production of matrix metalloproteinase 9 (MMP9) and inhibits cellular invasion; it also downregulates hedgehog (Hh) signaling.

References


Arunkumar E, Karthik D, Anuradha CV. Genistein sensitizes hepatic insulin signaling and modulates lipid regulatory genes.