

## Genistein supplement

Genistein is a plant-derived estrogen-like compound and one of several known isoflavones, including daidzein, found in a number of plants, with soybeans and soy products like tofu being the primary food source. Many people use this supplement for health benefits including the hope that it protects against cancer.

How is it sold?

Genistein is available in many supplements over the counter in the US. It is only available from a Compounding Pharmacy in Australia. You will find it as part of other isoflavones and not by itself. Genistein available in supplements is derived from soy products. Soy isoflavones are a group of compounds found in and isolated from the soybean.

### Side effects, safety, and toxicity

No major side effects in humans have yet been reported and this is partly due to the fact that few human studies have been done with this substance. However, we suggest not using excessive amounts as a supplement on a daily basis unless you take a day or two off a week and a few days off a month.

### Genistein genotoxicity: critical considerations of in vitro exposure dose.

Toxicol Appl Pharmacol. 2007. The Nelson Institute of Environmental Medicine, New York University School of Medicine, Tuxedo, NY, USA.

The potential health benefits of soy-derived phytoestrogens include their reported utility as cancer fighters, protective of heart tissue and as hormone replacement alternatives in menopause. Although there is increasing popularity of dietary phytoestrogen supplementation and of vegetarian and vegan diets among adolescents and adults, concerns about potential detrimental effects persist. While a variety of genotoxic effects of phytoestrogens have been reported in vitro, the concentrations at which such effects occurred were often much higher than the physiologically relevant doses achievable by dietary or pharmacologic intake of soy foods or supplements. This review focuses on in vitro studies of the most abundant soy phytoestrogen, genistein, critically examining dose as a crucial determinant of cellular effects. In consideration of levels of dietary genistein uptake and bioavailability we have defined in vitro concentrations of genistein >5 microM as non-physiological, and thus "high" doses, in contrast to much of the previous literature. In doing so, many of the often-cited genotoxic effects of genistein, including apoptosis, cell growth inhibition, topoisomerase inhibition and others become less obvious. Recent cellular, epigenetic and microarray studies are beginning to decipher genistein effects that occur at dietarily relevant low concentrations. In toxicology, the well accepted principle of "the dose defines the poison" applies to many toxicants and can be invoked, as herein, to distinguish genotoxic versus potentially beneficial in vitro effects of natural dietary products such as genistein.

### Cancer protection

The so-called phytoestrogens, like genistein and daidzein in soy, can bind to estrogen receptors and therefore interfere with the action of estrogen itself, a well-established risk factor for breast, ovarian and endometrial cancers. Although not all results are consistent, there is good evidence for protective influence of soy products against all three of these cancers. In addition, there have been many reports of preventive effects in the prostate.



## Genistein supplement

### Dry eyes

Pure Genistein Could Offer Relief for Dry Eyes, According to Newly Published Patent, a press release sent in 2009 by DSM Nutritional Products, Inc.

More than 20 million Americans suffer from the discomfort of dry eye syndrome (lacrimal keratoconjunctivitis), an ocular surface inflammation that develops from tear film failure. On October 9, 2008, the World Intellectual Property Organization published the pending patent by DSM Nutritional Products for genistein, which, according to the patent, when ingested, has been shown to provide a simple alternative to eye drops for maintaining healthy eyes. This discovery is based on a novel study in an animal model of induced dry eye syndrome. In this study, supplementation of the diet with genistein restored tear volume in the animals and increased the density of mucus-secreting goblet cells in an apparent dose-dependent manner. Goblet cells are responsible for the mucus layer in the conjunctiva of the eyelid. These findings suggest that genistein can potentially be used in dietary supplements to help maintain healthy eye structures and tear production, which would be a welcome alternative for millions of consumers who currently have little option but to use inconvenient eye-drop treatments. GeniVida, formerly known as BONISTEIN, is a branded pure non-soy genistein from DSM. It is available in both food- and pharmaceutical-grade and has an extensive, published safety package. GeniVida™ is available in both crystalline and tablet-grade forms. DSM Nutritional Products is the world's premier ingredient supplier to producers of functional foods, beverages, and dietary supplements. The organization provides a solid platform for technological innovation and new product development. Utilizing its extensive resources, DSM Nutritional Products keeps its customers ahead of the ever-changing marketplace, anticipating customer needs as nutritional trends develop and customer demands evolve. For more information, please contact DSM Nutritional Products, Inc., Parsippany, NJ. Comments: We will await human studies to determine whether genistein works equally well in men and women.

### Estrogen influence

Many isoflavones have been shown to interact with animal and human estrogen receptors, causing effects in the body similar to those caused by the hormone estrogen or sometimes blocking the effects of certain receptors. Soy isoflavones also produce non-hormonal effects.

### Soy isoflavones have an antiestrogenic effect and alter mammary promoter hypermethylation in healthy premenopausal women.

Nutr Cancer. 2009. Department of Surgery, University of Missouri School of Medicine-Columbia, One Hospital Drive, Columbia, MO, USA.

Thirty-four healthy premenopausal women were randomized to 40 mg or 140 mg isoflavones daily through one menstrual cycle. Breast specific and systemic estrogenic effects were assessed measuring the estrogenic marker complement (C)3 and changes in cytology, whereas methylation assessment of 5 cancer related genes was performed on intraductal specimens. Serum genistein significantly increased after consuming both isoflavone doses. Cytology did not significantly change at either isoflavone dose. Serum C3 levels posttreatment were inversely related to change in serum genistein in women consuming low but not high dose isoflavones. The RAR beta 2 hypermethylation increase



## Genistein supplement

posttreatment correlated with the posttreatment genistein level considering the entire group and those receiving high-dose isoflavones. At the low but not the high isoflavone dose, CCND2 hypermethylation increase correlated with posttreatment genistein levels. In summary, the inverse correlation between C3 and genistein suggests an antiestrogenic effect. Isoflavones induced dose-specific changes in RARbeta2 and CCND2 gene methylation, which correlated with genistein levels.

### **Inflammatory bowel disease, anti inflammatory effects**

Oral treatment with genistein reduces the expression of molecular and biochemical markers of inflammation in a rat model of chronic TNBS-induced colitis.

Eur J Nutr. 2009. Department of Molecular and Cellular Sports Medicine, German Sport University Cologne, Cologne, Germany.

Inflammatory bowel disease in humans has a high incidence in Europe and the USA, whereas in East Asia, incidence has been historically low. The risk of IBD appears to increase in Asian immigrants adopting western lifestyles, suggesting a strong link of environmental/dietary factors in the development of IBD, most likely dietary factors. Exposure to high levels of isoflavones such as genistein in traditional East Asian diets has been associated with a decreased risk of developing breast cancer and may also be beneficial for the prevention of Inflammatory bowel disease. In this study, the effect of orally administered genistein on the inflammatory response in the TNBS-induced chronic colitis rat model was investigated. Our results may provide evidence that oral administration of genistein exerts beneficial anti-inflammatory effects in a rodent model of TNBS-induced chronic colitis.

### **Osteoporosis treatment**

Genistein supplements may be useful for bone health although many studies of long duration are needed.

### **Genistein effects on quantitative ultrasound parameters and bone mineral density in osteopenic postmenopausal women.**

Osteoporos Int. 2009. Atteritano M, Mazzaferro S, Frisina A, Cannata ML, Bitto A, Macrì I, Frisina N, Buemi M. Department of Internal Medicine, University of Messina, Messina, Italy

This study aimed at evaluating the effects of genistein (54 mg/day) on calcaneus and phalanges ultrasound (QUS) parameters and bone mineral density in osteopenic postmenopausal women. We concluded that it prevented bone loss in the osteopenic postmenopausal women and improves QUS parameters at the calcaneus and phalanges. The purpose of the study was to evaluate the effects of genistein (54 mg/die) on quantitative ultrasound (QUS) parameters of the calcaneus and hand phalange and on bone mineral density (BMD) in osteopenic postmenopausal women. One hundred thirty-eight women (age 49-67 years) were assigned to receive genistein or placebo. Bone status was assessed at baseline and after a 1- and 2-year treatment. At the end of the experimental period, genistein had significantly increased BMD in the femur and lumbar spine. Our study confirms that genistein prevented bone loss in the osteopenic postmenopausal women and it improves the calcaneus and phalanges ultrasound parameters.