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Soy Isoflavones

Soy is a low cost source of protein that has been consumed in Asian nations for many centuries. Regular intake of soy is thought to be partially responsible for the lower rates of heart disease and cancer observed in far Eastern populations.

Isoflavones are members of the large flavonoid family of plant compounds, which are in turn members of the larger group of plant constituents known as polyphenols. The principle isoflavones in soy are genistein, daidzein, and their metabolites.

Sources:

Isoflavone compounds are found in a number of plants, but soybeans and soy products like tofu and textured vegetable protein are the primary food sources.

Food	Serving	Soy Protein (g)	Isoflavone content (mg)	Kcal
Soy burger	1 patty	8	7	100
Soy nuts	1 oz	12	38	150
Soy milk	1 c	8	24	100
Texturized vegetable protein (TVP)	1/4 c	14	27	50
Tofu	3 oz	9	33	45
Soy protein bar	1 bar	6	10-15	180
Soy breakfast patty	2 patties	16	4	160
Soy flour	1/4 c	12	33	90
Soy beans, boiled	1/2 c	7	47	190
Tempeh	1/2 c	18	36	200
Soy nut butter	2 Tbsp	8	0	160

Health Effects of Soy

Estrogenic & Antiestrogenic Activity:

Relative to physiological estrogens, isoflavones appear to be a weaker form of estrogen according to both in vitro and in vivo assays. It is thought that isoflavones can compete at estrogen receptor sites, blocking the natural estrogen produced by the body from binding to the site. Since high blood levels of estrogen are an established risk factor for breast cancer, weaker forms of estrogen may provide protection against this disease.

The prevailing hypothesis has been that isoflavones exert both antiestrogenic and estrogentic effects depending on the situation. In premenopausal women, isoflavones are antriestrogenic, whereas they are estrogenic in postmenopausal women. However, whether soy or isoflavones are antiestrogenic in premenopausal women is still under debate.

Breast Cancer:

Interest in the relationship between soy intake and breast cancer risk has been due, in large part, to the relatively low breast cancer mortality rates in Asian countries where soy foods are commonly consumed. In Japan, the breast cancer mortality rate is 1/4 of the mortality rate from breast cancer in the US.

Of the multitude of studies conducted outside of the US, it was found that there were decreases in breast cancer risk with consumption of soy products in premenopausal women, but not in postmenopausal women.

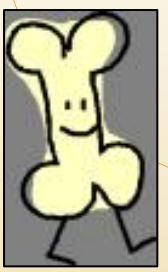
There is little epidemiologic support for the notion that soy intake is associated with a decreased risk of postmenopausal breast cancer. However, there is data suggesting that increasing soy intake yields a lower risk of premenopausal breast cancer.

Prostate Cancer:

There is speculation that the intake of soyfoods may be a factor contributing to the low prostate cancer mortality rate in Japan.

A mechanism by which researchers think soy isoflavones could potentially play a role in reduction of prostate cancer risk is that genistein has shown to inhibit the growth of both androgen-dependent and androgen-independent prostate cancer cells in vitro. A second possibility is that the estrogenic effects of isoflavones have a protective role in inhibiting metastatic prostate cancer.

Human data is limited in evaluating the soy-prostate cancer hypothesis. It appears that isoflavones appear in the prostatic fluid, and concentrations are highest in men from soy food consuming countries. Furthermore, isoflavones are concentrated largely in the prostatic fluid relative to plasma concentrations of isoflavones.



Soy and Bone Health:

Speculations about the potential benefits of isoflavones has in part been fueled by the similarity in chemical structure between the soybean isoflavones and the synthetic isoflavone, 7-isopropoxyisoflavone, which has been shown to increase bone mass in postmenopausal women.

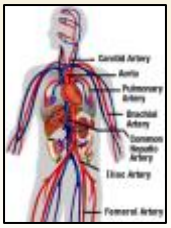
Two human studies that examined the effects of soy consumption on bone mineral loss in postmenopausal women have been reported thus far. In both studies, soy was associated with favorable effects on bone density or content.

Although the effects of soy and isoflavones on bone health constitute an exciting area of research, no firm conclusions have been reached at this time. However, with the large number of studies currently underway, more information will be available in the near future.

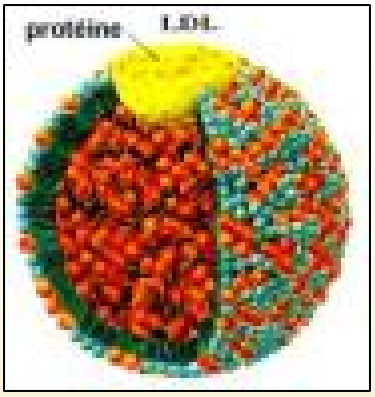
Soy and Cardiovascular Health:

Dietary soy protein has been shown to have several beneficial effects on cardiovascular health. The best-documented effect is on plasma lipid and lipoprotein concentrations, with reductions of about 5% in low density lipoprotein (LDL) cholesterol and triglycerides, and increases in high density lipoprotein (HDL) cholesterol of about 2%. Because of these beneficial effects of soy protein on plasma lipoproteins, the U.S. Food and Drug Administration approved a health claim for soy.

"25 g of soy protein a day, as part of a diet low in saturated fat and cholesterol, may reduce the risk for heart disease"



Dietary soy protein has also shown improvements in flow-mediated arterial dilation. Soy isoflavone extracts improve systemic arterial compliance, which is an indicator of atherosclerosis extent.



Soy has an effect on the LDL particle oxidation in both atherogenesis and vascular function. In healthy subjects receiving supplementation, soy treatment significantly delayed LDL oxidation. Based on this, and because isoflavones incorporate into LDL particles, there is much greater oxidation resistance in individuals who consume soy.

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