soy power

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Soy Power by Monica Emerich

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Eating soyfoods offers a boost in health and longevity.

The American public continues to be deluged with news about the miracles of soy. In late October 1999, for example, the Food and Drug Administration (FDA) issued a new health claim: "Twenty-five grams of soy protein eaten daily in conjunction with a diet low in fat and cholesterol may reduce the risk of cardiovascular disease."

The claim culminated decades of studies on the nutritional benefits of soyfoods. But proponents say that soyfoods offer even more, including protection from menopausal symptoms, osteoporosis and some types of cancer. Can this humble legume really offer so much?

The studies say yes. Soy protein contains all nine amino acids that the human body cannot manufacture. As an added value, soy protein offers the benefits of animal protein without the cholesterol and with less saturated fat. But there's more to soy than just protein ? soy also contains many health-boosting phytochemicals such as isoflavones, saponins, protease inhibitors, phytosterols, phenolic acids and phytate. Most of the research on soy, however, has been

focused on the two isoflavones, genistein and daidzein.

Isoflavones are biologically and chemically similar to the estrogen produced by humans, which helps maintain healthy bones. Yet isoflavones can function both as estrogen agonists and antagonists. This is why isoflavones may protect against the symptoms of menopause ? when estrogen is needed ? as well as protect against hormone-dependent cancers, when estrogen and other hormones exacerbate the disease (*Journal of Nutrition*, March 1995). Soy also contains the phospholipid lecithin, which contains choline. Both support the reproductive process, fetal development, liver and heart health, memory and physical performance, according to a study funded by the Ohio Soybean Council (Canty D Zeisel S. and Jolitz A. "Lecithin and Choline: Research Update on Health and Nutrition").

Fortunately, soy is widely available to consumers. Although soybeans have been cultivated in Asia for 5,000 years, today consumers can buy soy in tofu, soymilk and miso, as well as in protein powders, meat analogs, energy bars, dairy substitutes and more.

Cholesterol A much-cited 1995 meta-analysis of soy's health benefits compiled the results of 38 clinical studies. The survey showed that eating an average of 31 grams of soy protein daily significantly lowered blood cholesterol levels in humans (*New England Journal of Medicine,* Aug. 3, 1995). The study propelled soyfoods into the headlines of *The New York Times*, while sales jumped by 20 percent in one year. Sales continue to climb by that percent each year, and by more for some specific soyfoods categories, says Peter Golbitz, president of Soyatech, a soy research and publishing firm in Bar Harbor, Maine, and author of *Tofu and Soyfoods Cookery* (Book Publishing).

But isoflavones may need to be present in certain amounts to confer a health benefit. A study at Wake Forest University Baptist Medical Center in Winston-Salem, N.C., found that isoflavones reduced total cholesterol and low-density lipoproteins (LDL, a.k.a the bad cholesterol) when ingested in sufficient amounts.

In the study, 156 patients with moderately elevated cholesterol levels consumed a soy drink containing 25 grams of soy protein with or without isoflavones in varying levels (4 mg, 25 mg, 42 mg or 58 mg). Another group of patients took casein from cow's milk that didn't contain either soy protein or isoflavones. The results showed that the higher the concentration of isoflavones, the greater the reduction in both total and LDL cholesterol. In nine weeks, patients who started the study with high LDL cholesterol experienced a 10 percent reduction after consuming the high-concentrate soy drink. The soy drink with just 4 mg of isoflavones and the casein drink had no effect on cholesterol.

Reduction of cholesterol may be just one way in which soy products lower the risk of heart disease. Isoflavones also may relax and thereby expand arteries and reduce clot formation and plaque development, both major contributors to cardiovascular disease.

Additionally, choline helps break down homocysteine, the heart-damaging amino acid, while lecithin helps the liver metabolize fat and cholesterol and lowers blood-cholesterol levels (Canty, et al).

Menopause and Osteoporosis The research on soy as a modulator of menopausal symptoms is promising, but not conclusive. "Only two published studies exist on osteoporosis [and its relationship to soy]," explains Clare Hasler, Ph.D.,

executive director of the Functional Foods for Health Program, Department of Food Science and Human Nutrition, at the University of Illinois at Urbana-Champaign. By contrast, "there were 50 clinical trials included in the health claim petition to FDA for the [cardiovascular] health claim for soy."

Soy isoflavones may be useful in women with mild to moderate postmenopausal symptoms (hot flashes, night sweats, mood swings, loss of libido), but it is too early to tell whether soy can completely replace Hormone Replacement Therapy, according to Hasler's "Ask the Expert" column on her website, Soy and Human Health (http://spectre.ag.uiuc.edu/~stratsoy/expert/askhealth.html). She reports that one to four servings of soy per day may be effective in reducing symptoms, but additional clinical trials need to be conducted in order to know definitively how much soy to recommend.

For postmenopausal women, soy's weak estrogens may offer some hope in keeping bones strong and warding off osteoporosis. Osteoporosis is a bone-thinning disease affecting 15 million to 20 million Americans ? one of the highest rates in the world. Besides the estrogenic effect, soy also offers high levels of calcium in a highly bioavailable form. Eating protein causes calcium to drain through the urine, but it appears that such losses are lessened by eating vegetable protein as opposed to other proteins (*Journal of Clinical Endocrinology & Metabolism*, January 1988 and *Journal of Nutrition Science Vitaminology*, April 1990).

Epidemiological studies show that women in populations who traditionally eat substantial amounts of whole-soybean products (soymilk or tofu) have up to one-third the menopausal complaints of their non-soy-eating European

counterparts. However, researchers have had difficulty replicating the results in controlled studies.

"The problem is that oftentimes researchers are attempting to replicate studies without using the same type of whole soybean products eaten by the populations in the epidemiological study," Golbitz says. "Sometimes researchers will use isolated soy proteins or refined isoflavones instead of whole soybean products in later trials. This produces varying results. And some of the early studies were done with soy protein before researchers were aware of isoflavones in whole soyfoods."

Cancer The study of soy's anticarcinogenic properties is relatively young by medical standards, yet the studies that have been completed show hopeful results. Soy isoflavones act with both proestrogenic and antiestrogenic effects. In addition, genistein inhibits several key enzymes thought to be involved in carcinogenesis (*Journal of Nutrition*, March 1995).

A medical review of studies on soy's anticancer effects shows that isoflavonoids and lignans in soy are natural cancer-protective compounds (*Journal of Nutrition,* July 1995). But, says Hasler, "The FDA wants controlled human clinical intervention trials, and none have been published with respect to cancer."

Toward that goal, a British study concluded that preclinical trials on soy and breast cancer were positive enough to justify making soybean products a priority for clinical trials (*Annals of Oncology,* March 1997).

More Health Benefits Soy continues to offer additional

health benefits to people suffering from other conditions. For example, for those who suffer dairy allergies and lactose intolerance, soy products offer most of the nutritional benefits of milk. Allergies to soyfoods generally occur only in infants, and they usually grow out of it by age 2. Soy protein is rated 11 among foods in term of its allergenicity, Hasler says. For those adults who have soy allergies, reaction can be mild to serious.

"Diabetes is a relatively unexplored area with respect to soy research," Hasler says. "Clinical intervention trials must document that soy consumption blunts the insulin response in Type 1 or 2 diabetes. The carbohydrate [complex] profile in soybeans is promising in this regard, but not a lot of clinical data has been published."

And for those who suffer from gastrointestinal disorders, take heart. In his book *Soya for Health: The Definitive Medical Guide* (Mary Ann Liebert), Stephen Holt, M.D., says that soy's beneficial effects on the gastrointestinal tract may involve soy's ability to prevent cholesterol gallstones and provide indigestible fiber.

Looking For The Right Soy Products Despite the significant benefits of eating soy, some Americans may dislike the taste of soy and feel uncomfortable cooking it, preferring instead to gain isoflavones via supplementation. Experts, however, hotly debate whether soy supplements stack up to soyfoods in health protection.

"Very, very few studies in humans have been conducted with soy supplements compared to soyfoods," Hasler says. "Two that looked at isoflavone supplements' effects on blood-lipid levels were not effective, but another study showed that while there was no effect on blood lipids, there was a positive

effect on the elasticity of the blood vessels. Thus, different soy components may provide different health effects."

While headlines generally laud soyfoods' health properties, media attention surrounding genetically modified organisms (GMOs), particularly in the United States, has raised concerns about soy. "A recent study showed that some GMO soybeans have lower levels of isoflavones," Golbitz says. "Isoflavones are produced by soybeans when the plants are stressed. If the soybean plant is under less attack from pests or weeds, such as is the case with some GMO soybeans, then they will suffer less 'plant stress' and produce fewer isoflavones." The issue has become such a concern that Golbitz and other experts predict that by mid-2000, most soyfoods for human consumption will be non-GMO.

What other circumstances can affect the health-giving properties of soybeans? Many, Hasler says. "Isoflavone levels vary tremendously in foods based on the weather conditions during soybean growth, when and where beans are harvested, the type of soybean and, most importantly, the way soybeans are processed," she explains. "When soybeans are processed with alcohol [alcohol-washed], the isoflavone content is much lower than in soybeans that are 'water-washed'. "

Many experts in the soy industry expect the new FDA health claim for soy's protective cardiovascular effects will be the first in a series of claims for the soybean. The growing body of research on soy may yet prove that the soybean has beneficial effects on menopause, bones and cells, as well. Thanks to several positive findings, manufacturers have been encouraged to expand the offering of soy products, giving consumers more variety of products with improved taste and texture.

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