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# The Soy Connection

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HEALTH AND NUTRITION NEWS ABOUT SOY

## Research Updates

By Mark Messina, Ph.D.

### HRT Use Declines

The attitude of the medical community toward conventional hormone replacement therapy (HRT) has done a 180 degree turn within just the last two years, going from largely very positive to mostly negative. The reason is simple: the disappointing findings from two large clinical trials – the Heart and Estrogen/Progestin Replacement Study and the Women’s Health Initiative (WHI) – both of which showed the long-term possible harm of HRT outweighed any potential benefits. But how have postmenopausal women reacted to the news? Results from the first national survey of hormone use since 1995 clearly show that women are aware of the most recent research on HRT and have acted accordingly. Between 1995 and 2001, the percentage of women aged 50-74 years taking HRT increased from 33 percent to 42 percent, but by July 2003, this exposure had declined to only 28 percent. The decline in the use of Prempro, the specific type of HRT used in the WHI, is even more dramatic, decreasing by 70 percent. In 2001, the annual dispensed U.S. prescriptions were 18.8 million, but in 2003, that figure was only 5.3 million.

*JAMA 291: 47, 2003*

### Antioxidant Properties

Many phytochemicals are antioxidants and research

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## Experts Offer Opposing Viewpoints on Supplements

By Mark Messina, Ph.D.

The rise in the consumption of soyfoods partially stems from research suggesting soybean isoflavones have multiple health benefits. Soyfoods are essentially the only naturally-occurring dietary sources of these bioactive compounds. In response to consumer interest in isoflavones, isoflavone supplements were developed, first appearing on the market in 1996. There are now approximately 75 companies in the U.S. that sell isoflavone supplements (most of which are saponin-rich), alone or in combination with other nutrients and phytochemicals. Supplements provide an easy means to ingest isoflavones and are especially attractive to those who do not consume soyfoods. However, isoflavone supplements are not without controversy, as many soy researchers have recommended against their use. The purpose of this article is to examine arguments for and against the use of isoflavone supplements.

**◀POINT: Soy is more than isoflavones. Taking isoflavone supplements will not provide the full benefit of soyfoods.**

As is the case for all foods, the soybean is a complex mix of nutrients and non-nutritive bioactive components. It is the combined individual and synergistic effects of the entire mixture that accounts for the hypothesized coronary, anticancer and skeletal benefits of soy – a general concept referred to as food synergy – not the effects of just one single component.<sup>1</sup> Recent large clinical trials involving isolated nutrients including beta-carotene<sup>2</sup> and vitamin E<sup>3</sup> have not only failed to confirm suspected health benefits but actually increased disease risk in some cases. In part, this is because it is the complex chemical mixture found in

foods rich in these nutrients, not the isolated nutrients alone, that is actually responsible for the proposed benefits. These lessons about food synergy are applicable to soyfoods. For example, it is well established that soy protein, but not isolated isoflavones, lowers serum cholesterol.<sup>4</sup>

**▶COUNTERPOINT:** Isoflavones do not equal soyfoods and results, good or bad, from studies using isolated isoflavones can not automatically be extrapolated to soyfoods. But there is no dispute that the bulk of the research interest in soy is because of the isoflavones; approximately 600 papers on isoflavones are published annually, whereas relatively few are published on the other major soy components. Furthermore, the primary soybean isoflavone genistein has demonstrated potent anticancer effects in vitro<sup>5</sup> and isoflavones inhibit tumor growth in animals.<sup>6-8</sup> Isolated isoflavones have also demonstrated coronary<sup>9,10</sup> (enhanced arterial flexibility and vasodilation) and skeletal<sup>11</sup> (increased bone mineral density) benefits, and antioxidant effects<sup>12,13</sup> in humans. Most of the enthusiasm for the skeletal benefits of soy can be attributed to the “estrogen-like” effects of isoflavones.<sup>14</sup> Furthermore, interest in the relationship between soy and menopausal symptom relief is due entirely to the estrogen-like effects of isoflavones.<sup>15,16</sup> Although isoflavones may not provide all of the benefits of soyfoods – such as cholesterol reduction – substantial evidence suggests they likely account for most of the hypothesized benefits of soy.

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# Isoflavone Supplements *(Continued from Page 1)*

## ◀POINT: Isoflavone supplements discourage dietary change.

Incorporating soyfoods into the diet helps displace less healthy foods, therefore in theory, eating soyfoods provides both direct and indirect benefits. For example, substituting soy meat analogs for certain cuts of meat can substantially reduce the intake of saturated fat and cholesterol. Supplements create the misimpression that the benefits of a good diet can be duplicated by taking pills and thus discourage dietary change.

▶COUNTERPOINT: Some consumers may opt to use isoflavone supplements instead of eating soyfoods and as a result, not make overall dietary changes. However, many of the most popular soyfoods actually fall into the snack food category and aren't necessarily used as replacements for less healthy snacks.

Furthermore, consuming the number (2-4/day) of soyfood servings often recommended for health benefits represents a very significant challenge for most Americans. Consumers overwhelmed by this challenge may actually opt to consume no soy whatsoever if they feel they can not meet the recommended intake. Supplements provide an option for consumers who don't use soyfoods to get the benefits of isoflavones. Importantly, the use of soyfoods and supplements are not mutually exclusive. On any given day when the recommended isoflavone intake is not achieved via the consumption of soyfoods, supplements can be used as a "supplement" to reach the target intake goal. Thus, in some ways, one could argue that pills can actually encourage soyfood use. The approach to combining soyfoods with isoflavone supplements is analogous to how many women meet dietary calcium requirements – by using foods naturally high in calcium, calcium-fortified foods and calcium supplements.

## ◀POINT: Isoflavone supplements lead to excessive isoflavone intake.

Isoflavones are postulated to have health benefits but there is concern that like many nutrients and non-nutritive bioactive components, the intake of very high amounts may

lead to adverse health effects. Supplements often contain very high amounts of isoflavones – much greater than found in soyfoods – thereby making it too easy to ingest excessive amounts of these soybean components. In contrast, soy intake is self-limiting and thus even among soyfood enthusiasts isoflavone exposure is going to be much lower than possible via pills.

▶COUNTERPOINT: Although there are few data to suggest isoflavone intake is harmful, excessive intake of any biologically-active component is to be avoided. However, although a few supplements do contain very high and inappropriate amounts of isoflavones, the vast majority provide the amount (20-30 mg) found in one serving of a traditional soyfood.<sup>17</sup> Thus, excessive intake from most supplements is very unlikely.

Furthermore, the theoretical abuse by a tiny minority does not warrant recommending against the use of supplements in general. Also, supplements clearly indicate isoflavone content on their labels, thus allowing the consumer to easily monitor isoflavone intake. This is not the case for many soyfoods. Plus, many consumers operate under the mistaken belief that consuming very high amounts of bioactive compounds – if from foods – poses no risk.

## ◀POINT: Soyfoods are safe, whereas isolated isoflavones may not be.

Soyfoods have been consumed for centuries without apparent ill effects. Conversely, isoflavone supplements have been available only for a few years. Furthermore, the mix of components found within the soybean serves to mitigate any potentially

harmful effects of exposure to a single component in isolation.

▶COUNTERPOINT: Isoflavone supplements are a recent development, but from a toxicological perspective generally the critical issue is serum levels, not the source of a potentially harmful substance. Furthermore, several year-long clinical trials involving isoflavone supplements have been conducted without adverse effects being observed.<sup>10, 18</sup> Also, acute studies using extremely high doses indicate isoflavones are safe.<sup>19, 20</sup> Finally, many of the concerns about isoflavones are actually based on clinical trials and epidemiologic studies involving soyfoods, not supplements.<sup>21-24</sup>

## ◀POINT: You just don't know what you are getting when you buy isoflavone supplements.

Surveys indicate that there is often a huge discrepancy between the amount of isoflavones in supplements and the amount listed on the label. Thus, consumers really do not know what they are purchasing.

▶COUNTERPOINT: Surveys do show discrepancies between the supplement label and actual content. This is an industry-wide problem, and isoflavone supplements are no exception.<sup>17</sup> Still, most isoflavone supplements have been shown to contain within 20 percent of the label amount. Furthermore, there is a large variation in the isoflavone content of soyfoods not only from one type of product to the next, but among the same type of product, and within the same product over time.<sup>25</sup> Consumers should be advised to purchase supplements from reliable companies with a

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# Perspectives on Isolated Soy Protein Versus Traditional Soyfoods

By Mark Messina, Ph.D.

Sales of soyfoods have increased markedly over the past decade. Nutritional and health attributes are responsible for the increased popularity of soy, but consumption would likely not have increased to the extent that it has if not for the wide variety of soyfoods that have been developed over the past few years. Incredibly, in the year 2002 nearly 1,000 new soy products were brought to market. Although sales of the traditional Asian soyfoods – tofu, miso, tempeh – continue to increase, the most dramatic rise has been in the many recently created convenience products such as energy bars, flavored soynuts, chips, meat substitutes and beverages. In addition, increasingly soy is not consumed via soyfoods but rather “foods containing soy.” These latter products consist of traditional Western foods such as pasta and fruit beverages to which modest amounts of soy have been added. Foods containing soy allow consumers to enjoy soy without really having to significantly alter eating behavior.

Generally, but not always, the soy in the “foods with soy” and many of the convenience soyfoods is isolated soy protein (ISP), which by definition is at least 90 percent protein. In comparison to using the entire soybean, ISP allows manufacturers to more easily add soy protein to products, especially in high amounts. This is because ISP is less bulky – it is essentially carbohydrate-free and fat-free – and has a bland taste that allows food scientists to flavor it to meet the tastes of consumers. However, within the soy industry there is increasing debate about the relative health attributes of ISP-containing foods versus the traditional soyfoods.

The low rates of coronary heart disease and breast and prostate cancer in Asia are often cited as evidence of the health benefits of soy. But since there are differences in nutrient and phytochemical content between ISP and whole-bean products, whole-bean promoters argue that these low disease rates support the benefits of traditional soyfoods but not ISP. In contrast, ISP supporters correctly point out that near-

ly all of the clinical research – especially in the area of cholesterol reduction – involves ISP. ISP has certain practical advantages over more traditional soyfoods that better permit its use in large, longer-term, human studies.

Nutritionists generally recommend consuming as much as possible whole, unprocessed foods rather than more highly-processed ones. At first glance this perspective may seem like an endorsement of the traditional soyfoods over ISP, but the distinction between the two is not as clear as might appear. For example, the quintessential health food tofu is actually quite highly processed, as are many types of soymilk, because in both cases the carbohydrate and fiber are removed. In contrast, the fiber and carbohydrate, including the prebiotic oligosaccharides, are part of foods such as tempeh, soynuts and edamame.

Another difference is that the traditional, full-fat soyfoods such as those noted above are excellent sources of both essential fatty acids, the Omega-6 fatty acid linoleic acid and the Omega-3 fatty acid  $\alpha$ -linolenic acid based on their newly-established Adequate Intake values.<sup>1</sup> In fact, soy oil is the major source of Omega-3 fatty acids in the U.S. diet. In contrast, ISP is fat-free. Traditional foods also provide phytoosterols and vitamin E, both of which may have coronary and anti-cancer benefits, although it has not been established that the amounts present in these foods are sufficient to derive these hypothesized benefits.

The effect of processing on isoflavone content is also an important aspect when considering the advantages of ISP and traditional soyfoods. On average, ISP provides about 1 mg isoflavones/g protein, although there is quite a range among manufacturers, and one of the most popular isolates provides twice the average amount. In contrast, traditional soyfoods provide about 3.5 mg isoflavones/g protein. However, because ISP is less bulky, many ISP-containing foods provide as much as 15 g protein/serving and thus are still good sources of isoflavones.

Beyond differences in nutrient and phytochemical content, some concerns of late have arisen that processing denatures the protein, reducing quality and perhaps its ability to lower cholesterol.<sup>2</sup> It has been shown experimentally that when soy protein is subjected to heat and very alkaline conditions that lysinoalanine is formed.<sup>3</sup> Lysinoalanine is a potentially toxic compound that reduces protein quality. However, these conditions are more severe than those that typically exist in the commercial manufacture of ISP. As evidence, nitrogen balance studies in humans have demonstrated that commercial ISPs are a high-quality protein.<sup>4</sup>

More recently, some research has emerged that shows that the commercially-available ISPs are less hypocholesterolemic than an experimental ISP processed in a way that the manufacturers claim does not denature the protein.<sup>5</sup> Support for this observation comes from Italian researchers who published data showing a reduction in the content of a soy protein fraction in ISP that is thought to be responsible for cholesterol reduction.<sup>2</sup> However, this area of research is still in its infancy and many trials have shown commercially-available ISPs significantly lower serum cholesterol.

Finally, the use of traditional and more-processed soyfoods is not mutually exclusive. For newcomers to the world of soyfoods, there is no doubt that ISP-containing foods offer choices that are less intimidating and fit well within a typical Western diet. Traditionally, full-fat soyfoods may be better choices for some but not others. As noted above, there are differences in nutrient and phytochemical content. Further research is needed before concluding that these differences affect health attributes.

## REFERENCES

- 1) *Dietary reference intakes for energy, carbohydrate, fiber, fat, fatty acids, cholesterol, protein and amino acids. The National Academies Press, 2002.*

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# Understanding Soy Terms: A Guide for Consumers

F.Y.D.  
From Your Dietitian

Although you may have heard about the health benefits of soy, incorporating it into your diet may seem overwhelming at first. With countless soy products available, you might feel unsure about what to choose. Here is a list of terms to help you understand and evaluate soy products.

**FDA Soy Health Claim** – In October 1999, the U.S. Food and Drug Administration approved a statement that, “Diets low in saturated fat and cholesterol that include 25 grams of soy protein a day may reduce the risk of heart disease.” This health claim is based on research demonstrating soy protein’s heart-healthy benefits in lowering levels of total cholesterol and LDL, or “bad” cholesterol.

**Isoflavones** – Compounds that are naturally present in nutritionally significant amounts essentially only in the soybean and soyfoods. Isoflavones have a chemical structure similar to estrogen, and for this reason have some estrogen-like effects. This is why isoflavones are also referred to as phytoestrogens (plant estrogens). However, isoflavones are very different from estrogen and also have non-hormonal properties which

likely affect humans. Isoflavones are thought to have skeletal and coronary benefits, to help alleviate hot flashes, and to reduce the risk of certain cancers. One serving of traditional soyfoods has about 20-30 mg isoflavones.

**Isolated Soy Protein (ISP)** – Also referred to as soy protein isolate on a label. ISP is prepared from soybeans by removing most non-protein components. By definition, it is at least 90 percent protein, and ISP is essentially carbohydrate-free and fat-free. It is often added to foods like pasta, fruit beverages and energy bars for extra nutrition.

**Omega-3 Fatty Acids** – Soyfoods made from the whole bean are a good source of Omega-3 fatty acids. In fact, soybeans are one of the few plant sources of Omega-3, and soy oil is the major source in the U.S. diet. The American Heart Association recommends Omega-3 as beneficial for heart health.

**Soyfoods** – Soyfoods typically fall into two categories: Traditional and Soy Protein Products (SPPs). Examples of traditional soyfoods are soymilk (ground soybeans, mixed with water, cooked and filtered), tofu (cooked, pureed soybeans avail-

able in different textures for various uses in the kitchen), miso (cooked, fermented soybean paste used for seasoning), tempeh (cooked, fermented soybean cake) and edamame (green vegetable soybeans). SPPs are made from soy protein concentrate, soy flour or ISP (see definition above); examples include soy burgers, cereals, etc.

**Supplements** – Besides soyfoods, dietary supplements can provide another source of isoflavones in the diet. Soy isoflavone supplements are available at drug stores, natural food stores and other retailers in several dosage forms, including capsules, tablets, powders, granules and liquids. Sometimes soy protein powders are referred to as supplements, while other times only pills are called supplements.

**Texturized Soy Protein (TSP)** – Made from compressed soy flour or other soy ingredients, TSP is used as a nutritious extender in a variety of food products. It is available to home cooks as a dried, granular product that is rehydrated with boiling water. TSP takes on a texture similar to ground beef or stew meat. It is also known as texturized vegetable protein, TVP™. 🍌

## Vegetable Stuffed Shells

By Suzanne P. Vieira, M.S., R.D., L.D.N.

**Yield:** 4-6 servings

### Ingredients:

1/2 (12 oz.) package jumbo shells (approx. 18 shells)  
8 oz. container part-skim ricotta  
8 oz. silken tofu  
1 cup (4 oz.) shredded part-skim mozzarella cheese  
1/2 cup shredded carrot  
1/2 cup shredded zucchini  
1/4 cup sliced green onions  
1 egg  
1 – 26 oz. jar pasta sauce  
1/4 cup grated Parmesan cheese



**Method of Preparation:** Cook shells as package directs; drain. Preheat oven to 350 degrees. In large bowl, mix ricotta and tofu together first, then add mozzarella, carrots, zucchini, green onions and egg. Stuff shells with cheese mixture. In a 4-1/2 quart sauce pan, pour half the sauce; arrange stuffed shells in sauce. Top with remaining sauce. Cover; bake 30 minutes. Uncover; sprinkle with Parmesan cheese.

**Food Safety:** Keep all cheeses, tofu, and egg at 40 degrees or below. Hold at 140 degrees.

**Nutrition Facts:** Calories 420, Total Fat 10g, Saturated Fat 5g, Carbohydrate 60g, Total Protein 24g, Soy Protein 11g, Cholesterol 60mg, Dietary Fiber 5g, Sodium 620mg 🍌

reputation for producing high-quality products.

## REFERENCES

- 1) Messina M, Lampe JW, Birt DF, et al. Reductionism and the narrowing nutrition perspective: time for reevaluation and emphasis on food synergy. *J Am Diet Assoc* 2001;101(12):1416-9.
- 2) Paolini M, Abdel-Rahman SZ, Sapone A, et al. Beta-carotene: a cancer chemopreventive agent or a co-carcinogen? *Mutat Res* 2003;543(3):195-200.
- 3) Dutta A, Dutta SK. Vitamin E and its role in the prevention of atherosclerosis and carcinogenesis: a review. *J Am Coll Nutr* 2003;22(4):258-68.
- 4) Yeung J, Yu TF. Effects of isoflavones (soy phyto-estrogens) on serum lipids: A meta-analysis of randomized controlled trials. *Nutr J* 2003;2(1):15.
- 5) Sarkar FH, Li Y. Soy isoflavones and cancer prevention. *Cancer Invest* 2003;21(5):744-57.
- 6) Zhou JR, Yu L, Mai Z, Blackburn GL. Combined inhibition of estrogen-dependent human breast carcinoma by soy and tea bioactive components in mice. *Int J Cancer* 2004;108(1):8-14.
- 7) Zhou JR, Yu L, Zhong Y, et al. Inhibition of orthotopic growth and metastasis of androgen-sensitive human prostate tumors in mice by bioactive soybean components. *Prostate* 2002;53(2):143-53.
- 8) Zhou JR, Yu L, Zhong Y, Blackburn GL. Soy phytochemicals and tea bioactive components synergistically inhibit androgen-sensitive human prostate tumors in mice. *J Nutr* 2003;133(2):516-21.
- 9) Nestel PJ, Yamashita T, Sasahara T, et al. Soy isoflavones improve systemic arterial compliance but not plasma lipids in menopausal and perimenopausal women. *Arterioscler Thromb Vasc Biol* 1997;17(12):3392-8.
- 10) Squadrito F, Altavilla D, Crisafulli A, et al. Effect of genistein on endothelial function in postmenopausal women: a randomized, double-blind, controlled study. *Am J Med* 2003;114(6):470-6.
- 11) Morabito N, Crisafulli A, Vergara C, et al. Effects of genistein and hormone-replacement therapy on bone loss in early postmenopausal women: a randomized double-blind placebo-controlled study. *J Bone Miner Res* 2002;17(10):1904-12.
- 12) Fritz KL, Seppanen CM, Kurzer MS, Csallany AS. The in vivo antioxidant activity of soybean isoflavones in human subjects. *Nutr Res* 2003;23:479-87.
- 13) Djuric Z, Chen G, Doerge DR, Heilbrun LK, Kucuk O. Effect of soy isoflavone supplementation on markers of oxidative stress in men and women. *Cancer Lett* 2001;172(1):1-6.
- 14) Setchell KD, Lydeking-Olsen E. Dietary phytoestrogens and their effect on bone: evidence from in vitro and in vivo, human observational, and dietary intervention studies. *Am J Clin Nutr* 2003;78(3):593S-609S.
- 15) Messina M, Hughes C. Efficacy of soyfoods and soybean isoflavone supplements for alleviating menopausal symptoms is positively related to initial hot flush frequency. *J Med Food* 2003;6(1):1-11.
- 16) Adlercreutz H, Hamalainen E, Gorbach S, Goldin B. Dietary phytoestrogens and the menopause in Japan. *Lancet* 1992;339(8803):1233.
- 17) Setchell KD, Brown NM, Desai P, et al. Bioavailability of Pure Isoflavones in Healthy Humans and Analysis of Commercial Soy Isoflavone Supplements. *J Nutr* 2001;131(4):1362S-75S.
- 18) Chen YM, Ho SC, Lam SS, Ho SS, Woo JL. Soy isoflavones have a favorable effect on bone loss in Chinese postmenopausal women with lower bone mass: a double-blind, randomized, controlled trial. *J Clin Endocrinol Metab* 2003;88(10):4740-7.
- 19) Busby MG, Jeffcoat AR, Bloedon LT, et al. Clinical characteristics and pharmacokinetics of purified soy isoflavones: single-dose administration to healthy men. *Am J Clin Nutr* 2002;75(1):126-36.
- 20) Takimoto CH, Glover K, Huang X, et al. Phase I pharmacokinetic and pharmacodynamic analysis of unconjugated soy isoflavones administered to individuals with cancer. *Cancer Epidemiol Biomarkers Prev* 2003;12(11 Pt 1):1213-21.
- 21) White LR, Petrovitch H, Ross GW, et al. Brain aging and midlife tofu consumption. *J Am Coll Nutr* 2000;19(2):242-55.
- 22) North K, Golding J. A maternal vegetarian diet in pregnancy is associated with hypospadias. The ALSPAC Study Team. *Avon Longitudinal Study of Pregnancy and Childhood. BJU Int* 2000;85(1):107-13.
- 23) Bell DS, Ovalle F. Use of soy protein supplement and resultant need for increased dose of levothyroxine. *Endocr Pract* 2001;7(3):193-4.
- 24) Hargreaves DF, Potten CS, Harding C, et al. Two-week dietary soy supplementation has an estrogenic effect on normal premenopausal breast. *J Clin Endocrinol Metab* 1999;84(11):4017-24.
- 25) Setchell KD, Cole SJ. Variations in isoflavone levels in soy foods and soy protein isolates and issues related to isoflavone databases and food labeling. *J Agric Food Chem* 2003;51(14):4146-55. ☺

## Research Updates *(Continued from Page 1)*

showing isoflavones exert antioxidant effects under some experimental conditions is not new. Antioxidant effects of isoflavones have been observed in vitro, in animals and in humans. But what is new is research from the University of Alabama showing that modified versions of isoflavones formed within some cells are actually more potent antioxidants than the unmodified forms. More specifically, chlorinated and nitrated forms of genistein and daidzein were found to be more potent than genistein and

daidzein at inhibiting LDL-cholesterol oxidation. *Free Radical Biol Med* 35: 1417, 2003

### Genistein

Radioprotective agents are compounds that are administered before exposure to ionizing radiation to reduce its damaging effects, including radiation-induced lethality. Radioprotectants have applications in clinical oncology, space travel, radiation site clean-up, radiological terrorism and military scenarios. Researchers from the Armed

Forces Radiobiology Research Institute in Bethesda, Md., examined the radioprotective properties of genistein. Mice were administered a single subcutaneously-injected dose of different concentrations of genistein either 24 hours or one hour before a lethal dose of gamma radiation. The survival of mice given genistein one hour before gamma radiation was not different from mice exposed to radiation but not given genistein. In contrast, the 30-day survival of

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mice given genistein 24 hours prior to radiation increased in a dose-dependent manner. Survival differences between those given and not given genistein were significantly different. Genistein did not affect body weight, histopathology or behavior even at the highest dose, which was 1,000-fold greater than the typical Asian intake. Further research is warranted to determine whether the radio-protectant effects of genistein, and perhaps soyfoods, observed in mice may extend to humans and the clinical setting.

*J Applied Toxicol 23: 379, 2003*

### **Bone Mineral Density (BMD)**

Research from China published by soy researcher Suzanne C. Ho from the Chinese University of Hong Kong adds to the considerable epidemiologic data showing that among Asian populations, greater soy consumption is associ-

ated with higher BMD. In this particular study, the BMD of 454 healthy Chinese women within 12 years of menopause was examined. There was a trend among both early and late (> four years) postmenopausal women for soy protein intake to be associated with greater BMD at all bone sites except the spine. However, this trend was only significant among late postmenopausal women. Among these women, differences in BMD between the first and fourth quartile of soy protein intake ranged from 4-8 percent. Isoflavone intake among women in the fourth quartile was estimate to be about 40 mg/day.

*Osteoporosis Int 14: 835, 2003*

### **Breast Cancer**

For more than 15 years, soyfoods have been studied in relation to breast cancer risk. Largely because the soybean is a source of

isoflavones there is enthusiasm for the potential for soy to decrease risk, especially when consumed during the teenage years. However, there is also concern that isoflavones may stimulate breast cancer growth. New animal research by Harvard University investigators suggests this is unlikely to be the case. In this study, mice were implanted with estrogen-positive breast cancer cells and then fed diets with or without isoflavones. Isoflavones significantly inhibited the growth of mammary tumors. Tea, especially green tea, was also protective, and the combination of green tea and soy isoflavones reduced tumor growth more than either agent in isolation. There was no evidence from this particular model that isoflavones could stimulate the growth of existing mammary tumors.

*Int J Cancer 2004;108(1):8-14* ☺

## Perspectives *(Continued from Page 3)*

- 2) Gianazza E, Eberini I, Arnoldi A, Wait R, Sirtori CR. A proteomic investigation of isolated soy proteins with variable effects in experimental and clinical studies. *J Nutr 2003;133(1):9-14.*
- 3) Sarwar G, L'Abbe MR, Trick K, Botting HG, Ma CY. Influence of feeding alkaline/heat processed proteins on growth and protein and mineral status of rats. *Adv Exp Med Biol 1999;459:161-77.*
- 4) Rand WM, Pellett PL, Young VR. Meta-analysis of nitrogen balance studies for estimating protein requirements in healthy adults. *Am J Clin Nutr 2003;77(1):109-27.*
- 5) A new isolated soy protein with high levels of non-denatured protein shows twice the cholesterol-lowering effect compared to a commercial isolated soy protein. *American Oil Chemists' Society, 2003.* ☺

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