SOY MEN'S HEALTH

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Soyfoods may offer men significant health benefits, such as lowering the risk of prostate cancer, heart disease and more. As this factsheet will discuss, men need not fear the risk of feminization.

Introduction

Much of the research on the health effects of soyfoods has focused on postmenopausal women. In large part, this is because the soybean is such a rich source of isoflavones, a group of naturally-occurring plant chemicals that possess estrogen-like properties.[1] As a result, some men are reluctant to eat soyfoods because of the mistaken belief that isoflavones exert feminizing effects. However, not only is this concern without scientific merit, but there is a large amount of evidence suggesting adding soyfoods to the diet can greatly benefit men by reducing the risk of prostate cancer and heart disease. There is also very preliminary evidence that consuming soyfoods might protect against male pattern baldness.[2]

Health organizations, such as the American Institute for Cancer Research, recommend obtaining a higher percentage of dietary protein from plant foods as a means of reducing cancer risk.

Isoflavones

The two primary isoflavones in soybeans are genistein and daidzein.[3] Average isoflavone intake among older Japanese men is about 40 mg/day, which is the amount provided by about 10 to 12 g of soy protein from traditional soyfoods.[4] Each serving (e.g., 1 cup soymilk or ½ cup tofu or edamame) of a minimally processed soyfood provides about 25 mg of isoflavones or 3.5 mg isoflavones per gram of protein. Generally, more processed soy products have much lower isoflavone concentrations (mg/g protein) than traditional soyfoods.

Isoflavones have a chemical structure similar to the primary female reproductive hormone estrogen (although older men actually produce more estrogen than older women) so not surprisingly they bind to estrogen receptors and possess some estrogen-like properties. For this reason, isoflavones are commonly referred to as phytoestrogens.[5] However, isoflavones and estrogen are very different molecules and, as such, they often exert different physiologic effects. The literature is replete with examples wherein isoflavones affect biological endpoints differently than estrogen.[6-26] The fact is that isoflavones are more accurately classified as selective estrogen receptor modulators (SERMs) than as phytoestrogens.[17, 27, 28]

SERMs exert tissue-selective effects. They have estrogen-like effects in some tissues, effects opposite to those of estrogen in other tissues, and in some tissues, no effects at all despite the presence of estrogen receptors. Since there is no "class effect" of SERMs, that is, since each SERM has different physiological properties, the effects of isoflavones can only be determined by direct experimentation.[29] Furthermore, because soybeans contain many biologically active components, soyfoods should not be equated with isoflavones.

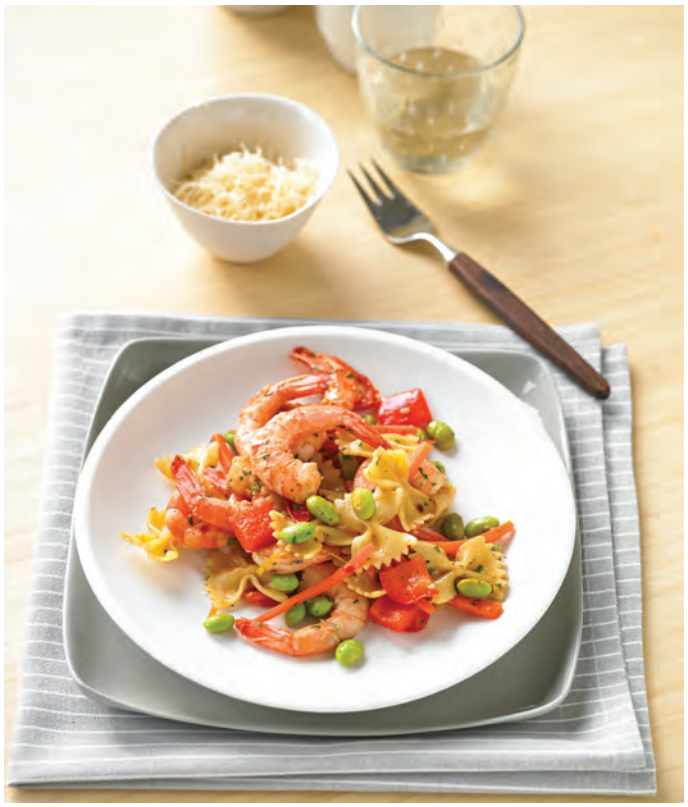
Research has shown that soy is safe for men to consume and that they may benefit by including soyfoods in their diet.

The ability of isoflavones to exert tissue-selective effects almost certainly stems in part from their preferential binding to and transactivation of estrogen receptor beta (ERß) in comparison with ERα. This preference is important because these two receptors have different tissue distributions within the body and when activated can have different and sometimes opposite effects. Consequently, the ERα:ERß ratio within a given cell type greatly influences the effect of estrogen and other ER-binding ligands on that cell. Furthermore, each ligand may induce ligand-ER conformations that preferentially recruit specific cofactors within the cell, thereby inducing differential responses.[30] Recent evidence suggests that ligands that target ERß promote breast and prostate health.[31] Since ERß also predominates in the skin, ERß-preferring ligands may also improve skin health.

Soyfoods as Sources of Protein

Most American men meet or exceed the recommended dietary allowance (RDA) for protein, although this may not be the case for as many as 40% of older men.[32] Furthermore, some recent data suggest that the RDA may be too low and that protein intake exceeding the RDA may be advantageous.[33-35] For example, evidence suggests that consuming protein in excess of the RDA may be beneficial for weight loss,[36] reducing risk of osteoporosis,[37] enhancing the benefits of vigorous physical activity[38] and lowering blood pressure.[39, 40] Also, in older men, dietary protein intakes above the RDA may help to prevent sarcopenia or age-related loss in skeletal muscle.[41, 42] To prevent this disease, researchers from the University of Texas Medical Branch recommended the consumption of at least 30 g of protein at each of the three primary meals.[35]

Soyfoods can play important roles in helping men meet protein needs while maintaining a healthful diet as they provide ample amounts of high-quality protein but are typically low in saturated fat.[43-47] Since the protein in products such as isolated soy protein is comparable in quality to meat and milk protein, soyfoods can be recommended as protein-rich options.[44, 48] Furthermore, there is preliminary evidence that soy protein places less stress on the kidneys in comparison to other high-quality proteins, which over time could reduce the risk of developing renal disease in susceptible individuals, such as those with diabetes.[49, 50] This potential benefit may take on mounting importance as the prevalence of chronic kidney disease increased 30% during the past 10-years.[51]



Finally, soy protein supplementation leads to muscle accretion in response to resistance exercise[52] and may actually have some advantages over other high-quality proteins by reducing exercise-induced inflammation and oxidation.[53-55] Clearly, there is a role for soy protein in the diets of those seeking to increase muscle mass. In fact, a recently published study found that in comparison to whey protein alone, which is considered to be an excellent quality protein for building muscle, a blend of soy protein, casein and whey, stimulated muscle protein synthesis in response to high-intensity leg resistance exercise to a greater extent.[56]

Coronary Heart Disease Prevention

Soyfoods potentially offer three-way protection against heart disease. First, because they are generally low in saturated fat and high in polyunsaturated fat (PUFA, the essential omega-6 fatty acid linoleic acid comprises ~55% of the total fat content), soyfoods can help reduce blood cholesterol when they displace more traditional sources of protein in Western diets, which tend to be high in saturated fat.[57, 58] A recent analysis suggested that through displacement, soyfoods can reduce low-density-lipoprotein cholesterol (LDLC) 3-6%.[59] Recently, the American Heart Association (AHA) highlighted the important role of PUFA in reducing blood cholesterol levels and risk of heart disease.[60] Importantly, some analyses show that CHD risk is reduced when saturated fat is replaced with PUFA, but not when replaced with carbohydrates,[61, 62] or monounsaturated fat, and that the ideal substitution is a combination of omega-6 and omega-3 PUFA.[63]

Therefore, soyfoods will result in an especially desirable change in the fatty acid content of the diet because the soybean is among the few good plant sources of the essential omega-3 fatty acid, alpha-linolenic acid (ALA),[64] which is thought to have independent coronary benefits.[65-67] To this point, a recent study found men with a high intake of ALA had lower inflammatory biomarkers associated with a reduced risk of CHD.[67]

Second, soy protein directly lowers blood cholesterol levels.[68] The cholesterol-lowering effect of soy protein is very modest compared to statins – the most commonly used class of medication for lowering cholesterol – but even the 4 to 6% reduction in LDLC in response to soy protein[68-71] can in theory, reduce heart disease risk by 10% over a period of years[72, 73] (some evidence indicates the hypocholesterolemic effects of soy protein may be greater in men than in women[68]). The combined effect of soy protein plus the improvement in the fatty acid content of the diet when soyfoods are consumed will substantially reduce LDLC and therefore, CHD.[59]

Soyfoods can help lessen blood cholesterol when they displace more traditional sources of protein in Western diets.

Third, research suggests that soyfoods may reduce CHD risk independent of their effects on elevated blood cholesterol, which is just one CHD risk factor. In addition to lowering LDLC, soy protein also lowers triglyceride levels by 5-10%.[68-71] Although there is debate about the significance of an elevated triglyceride level as an independent predictor of CHD risk,[74] recent evidence suggests that the role of triglycerides in the etiology of CHD has been underestimated.[75, 76] Furthermore, new research suggests that soy protein decreases postprandial triglyceride levels, elevated levels of which are increasingly viewed an important CHD risk.[77] Also, in contrast to some dietary interventions that lower both LDLC and high-density lipoprotein cholesterol (HDLC), soy protein intake leads to very modest increases (1-3%) in HDLC.[68-71] Each 1% or 1 mg increase in HDLC lowers CHD risk by 2-3%.[78, 79] A new statistical analysis of the relevant scientific literature conclusively showed that even when LDLC is low, raising HDL levels is beneficial.[80]

The effect of soyfoods on CHD risk factors unrelated to lipid levels is also gaining interest. For example, four recently published meta-analyses found that soy modestly lowers blood pressure.[47-50] In the largest of these, which included 27 studies, soy lowered systolic and diastolic blood pressure by 2.21 and 1.44 mgHg, respectively.[48] Estimates are that lowering blood pressure even by this degree can reduce risk of stroke by about 10% and CHD by about 5%.[81]

Soy protein intake has also been shown to increase LDL particle size, shifting LDL particle distribution to a less atherogenic pattern.[82] Over a period of 5-years, this change was estimated to result in a 5% reduction in risk of ischemic heart disease.[82] Another study found that the consumption of soy flour led to a decrease in oxidative stress markers in men, reflecting a decreased risk of CHD.[83]

There is also some, albeit inconsistent, clinical evidence indicating that soy intake and isoflavone exposure reduces levels of C-reactive protein (CRP).[84] CRP is a general indicator of inflammation; the measurement of this marker was recently designated by the American Heart Association as an optional screening test when risk-based decisions regarding initiation of pharmacological therapy are uncertain following quantitative risk assessment.[85]

Finally, a recently published epidemiologic study from China supports the clinical data regarding the effects of soy on non-lipid CHD risk factors. In this cross-sectional study involving middle-aged adult men and women, habitual soy intake was associated with dose-dependent decreases in mean bifurcation intima-media thickness.[86] The effect was more apparent in men than women and greater than could be expected from the cholesterol-lowering effect of soy protein alone. Non-invasive assessment of intima-media thickness of the carotid arteries is widely used as an intermediate or proxy measure of generalized atherosclerosis.[87] However, in contrast to this study, a large prospective study from Shanghai found that over the 5.4-year follow-up period, soy intake was associated with an increased risk of CHD among men.[88] Although this finding is inconsistent with a considerable amount of data (and contrasts with the effects in women) and was published as a letter to the editor, rather than as a full manuscript, the finding warrants additional investigation.

Prostate Cancer Prevention

Cancer of the prostate is the most common cancer among U.S. men and the second most common cause of cancer death.[89] Much evidence indicates that an overall healthful diet, as well as specific nutrients and phytochemicals, can reduce prostate cancer risk and perhaps even help treat this disease.[90-92] Since prostate cancer is typically diagnosed at an older age and prostate tumors are generally slow-growing, even modestly delaying the onset and/or slowing the growth of these tumors may dramatically reduce the number of prostate cancer deaths.[93-96]

In 2000, the International Prostate Health Council suggested that because soyfoods contain isoflavones, they may be one factor contributing to the low Japanese prostate cancer mortality rates.[97] More recently, researchers at the University Hospital in Bonn, Germany, concluded that the soybean isoflavone genistein has the potential to prevent prostate cancer.[98]

In agreement, researchers from the University of Illinois at Chicago and Xinxiang Medical University, in China, concluded that although "the role of soy isoflavones in prostate cancer has traditionally been linked with the suppression of proliferation and the induction of apoptosis, … there is a compelling evidence that soy isoflavones regulate other cancer-related cellular processes."[99]

Research in animals supports these conclusions,[100, 101] as do the epidemiologic data overall[102, 103] the latter of which suggests soy intake reduces prostate cancer risk by as much as one half.[102] Epidemiologic examples of such protection include a Chinese case-control study, which found men who consumed soybean products more than once per day had an odds ratio of 0.29 for prostate cancer compared with men who consumed soybean products less than once per week.[104] In fact, soyfood intake was the only preventive factor in this study. In agreement, in a nested case-control study within the Japan Public Health Center-based Prospective Study, the odds ratio for localized prostate cancer for those in the highest group of plasma genistein and equol (see below) compared with the lowest was 0.54 and 0.43, respectively.[105]

Although speculative, whether soyfoods reduce the risk of prostate cancer in any given person may depend in part on isoflavone metabolism, which varies greatly among individuals. To this point, approximately 25% of Westerners and 50% of Japanese possess the intestinal bacteria capable of converting the isoflavone daidzein into equol.[106] This may be important with respect to prostate cancer because in rodents, equol is able to bind to and sequester 5^{α}-dihydrotestosterone (the biologically active form of testosterone).[107] This sequestering action led to a decrease in mouse prostate tissue growth, reflecting possible reduction in prostate cancer risk. Furthermore, among Asian men, a recently published epidemiologic study found that the proportion of equol producers was significantly smaller in those with prostate cancer than in the cancer-free control group. Also, fewer equol-producers were found among patients with poorly differentiated adenocarcinoma than in those with well or moderately differentiated adenocarcinoma.[108] The former type of tumor is more aggressive.

Prostate cancer is the most common cancer among U.S. men and the second most common cause of cancer death.

Soyfoods protect against heart disease in the following ways:

- Displacing high saturated fat foods from their diet
- Modestly lowering LDL-cholesterol
- Potentially improving lip-independent risk factors

A team of Japanese researchers noted that if equol can reduce risk of prostate cancer, "a possible strategy for reducing the risk … may be to increase the proportion of equol-producers by changing the intestinal flora to carrying an equol-producing bacterium with dietary alteration or probiotic technology."[109]

In addition to helping to prevent the development of prostate cancer, there is speculative but intriguing animal and human evidence suggesting soy may also be useful for stopping its spread. Prostate cancer, like many cancers, is fatal only when the tumor metastasizes from the site of origin to vital organs. A study published in the Journal of the National Cancer Institute reported that the activity of an enzyme that allows cells to invade tissues – matrix metalloproteinase-2 – was markedly reduced in men with prostate cancer who were given the soybean isoflavone genistein.[110] In agreement, adding isoflavones to the diet of mice inhibited prostate tumor metastasis to the lung – the primary site of metastasis in this animal model – by 96%.[111]

Prostate cancer is typically diagnosed at an older age and prostate tumors are generally slow-growing. Even modestly delaying the onset and/or slowing the growth of these tumors may dramatically reduce the number of prostate cancer deaths.

To examine the potential role of soy in reducing prostate cancer risk, numerous investigators have examined the impact of isoflavone-rich products on levels of prostate specific antigen (PSA). PSA is the most common clinical test for the detection of prostate cancer although its use in routine screening has recently been challenged.[112-114] PSA is also a measure by which treatment efficacy can be assessed.[113] In men with prostate tumors, serum PSA concentration is proportional to prostate tumor volume[115] and successful treatments for prostate cancer lower PSA levels.[116-124]

The evidence that soy or isoflavones affect PSA levels is mixed. In a review published in 2006, no effects were noted in healthy participants with low PSA levels.[125] However, the lack of effect on PSA doesn't necessarily contradict the animal[126] or epidemiologic data[102] supportive of the protective effects of soy since recent clinical data indicate that, in healthy men with low PSA levels, it is possible to reduce prostate cancer risk without affecting PSA.[127]

In contrast to the results in healthy men, four of the eight trials involving men with prostate cancer that were included in the 2006 review showed isoflavones slowed the rise in PSA levels, although no study reported an absolute decrease.[125] In support of these findings, a study published subsequent to this review found that in men with prostate cancer, PSA levels increased 56% per year prior to study entry but only 20% per year when men consumed about 3 servings of soymilk daily for 12 months.[128] More recently, Kwan et al.[129] found in a pilot study that isoflavones tended to slow the rise in PSA levels in men with prostate cancer. Interestingly, Ide et al.[130] found that a combination of curcumin and isoflavones markedly decreased PSA levels in men with prostate cancer whose PSA levels were ≥10 ng/ml. In agreement, in a pilot study by Lazarevic et al.[131] in men with localized prostate cancer who were given 30 mg/day genistein for 3 to 6 weeks, there was a 7.8% decrease in PSA whereas in the placebo group it increased by 4.4%.

In another pilot study by Joshi et al.[132] of seven men with prostate cancer who had failed conventional treatment (surgery and radiation therapy) as judged by rising PSA levels:

- Four experienced a favorable response to the consumption of three servings of soyfoods per day over a two-year period (PSA levels that permanently or temporarily declined or remained stable was judged to be a favorable response).
- One of the three patients, who in addition to surgery and radiation opted for androgen deprivation therapy, responded favorably to soy.

These results are impressive considering conventional treatment was unsuccessful.

Finally, in a study involving men with high grade prostatic intraepithelial cells (HGPIN) or atypical small acinar proliferation, it was found that 34 and 21% of the men in the placebo and isoflavone groups developed cancer, respectively. Even greater differences were observed among the older men in this study; among those ≥65-years of age, 57 and 28% of the men in the placebo and isoflavone groups, respectively, developed cancer.[133]

In contrast to these studies, deVere White et al.[134] failed to find that extremely high-dose isoflavones affected PSA levels in men with prostate cancer who were enrolled in an active surveillance program. Also, a 3-year study involving 303 men with HGPIN found a combination of soy protein (40 g/day), vitamin E (800 IU/day) and selenium (200 mg/day selenium) did not affect the number of men who developed cancer in comparison to the placebo.[135] While these results are discouraging, caution is needed when drawing conclusions about the effects of soy in this study because a combination treatment was employed and some evidence indicates that vitamin E supplementation, and possibly selenium, may actually increase risk of developing prostate cancer.[136, 137]

Epidemiologic evidence suggests that men who eat soyfoods daily are less likely to develop prostate cancer than those who do not.

Nevertheless, two other studies also failed to find isoflavones were not efficacious. In one, the participants were men at high risk of recurrence after radical prostatectomy for prostate cancer. They were randomized to consume a control protein (casein, n=87) or soy protein (n=90).[138] In the other study, men who had been diagnosed with prostate cancer were randomized to receive isoflavones or placebo for up to six weeks prior to prostatectomy.[139] Although the results of these latter two trials are disappointing, they are not entirely surprising because of the low isoflavone dose used in both studies. Men in the isoflavone groups received only either 24[138] or 8[139] mg genistein per day. To put this rather low dose into perspective, there are ~10 mg of genistein in one cup of soymilk. To expect robust effects on the prognosis of prostate cancer patients in a relatively short time period in response to such low genistein intakes may be unrealistic.

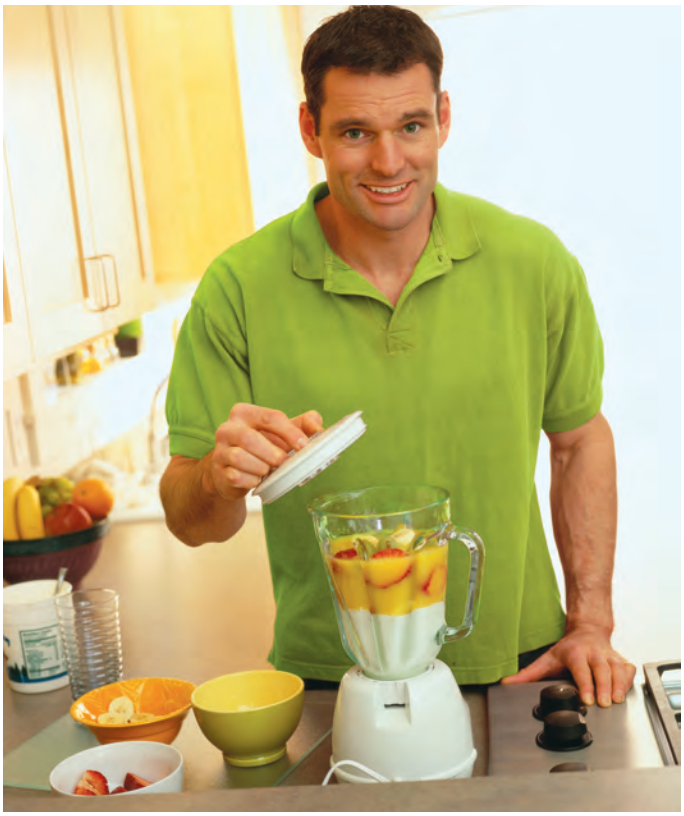
In conclusion, although no definitive conclusions can be made, there are suggestive data indicating that soy consumption may prevent the development of prostate cancer and aid in the treatment of this disease by inhibiting the spread of prostate tumors and slowing prostate tumor growth. There is even preliminary evidence that isoflavones reduce the side effects associated with radiation treatment for prostate cancer.[140]

Isoflavones and Feminization

The estrogen-like effects of isoflavones have led to investigation of the effects of soyfoods on male reproductive hormones and sperm and semen parameters. Ironically, given the large populations of soyfood-consuming countries, concern has arisen that soyfoods might even impair male fertility. However, as discussed below, concerns about feminization are without scientific merit.

Two studies that evaluated reproductive hormone levels in men did find statistically significant reductions in testosterone levels in response to soy protein intake. In the first, in addition to their normal diet, 19 young men consumed three scones per day made with either soy or wheat flour for a period of six weeks.[83] Serum testosterone levels decreased from baseline values by almost 6% in the soy group. However, because the final values in the control group were not reported, it is not possible to know whether the difference between groups (the most relevant comparison) was statistically significant. Furthermore, isoflavone exposure in this study was about four times the typical Japanese intake. In the other study, there was a much larger decrease (19%) in testosterone levels, but only 12 men were enrolled in this study and the decrease resulted primarily from the change in just two participants.[141] Furthermore, this study lacked a control group. Also, in one of the two men in which the large decrease occurred, baseline testosterone levels greatly exceeded the normal range and the decrease continued for several weeks even after discontinuation of soy protein. As in the previous study, soy intake (56 g soy protein/day) was about four times the typical Japanese intake.

In contrast to these two studies, a meta-analysis published in 2010 that included 32 studies (including the two noted above) and 36 treatment groups found there were no significant effects of soy protein or isoflavone intake on levels of total testosterone, sex hormone binding globulin, free testosterone or the free androgen index.[142] Studies published subsequent to this analysis are supportive of this conclusion.[133, 143]



Interest in the effects of isoflavones on sperm quality and quantity is due, in part, to reports that sperm count may have declined over the past few decades. Whether environmental estrogens may have contributed to this decrease is a matter of much debate.[144] In fact, there is also debate about whether sperm count has actually decreased.[145] More directly related to soy are the results of a small pilot case-control study conducted by researchers from Harvard University School of Public Health, which found that men who were classified as soy-consumers had lower sperm concentrations than non-consumers of soy.[146] However, there were several limitations to this study that warrant mention.

There is no meaningful clinical evidence that suggests soy protein lowers serum testosterone levels or exerts any estrogen-like or feminizing effects in men.

First, about half of the decreased sperm concentration resulted from an increase in ejaculate volume. Second, the decrease in sperm concentration only occurred in men consuming the most amount of soy – that is, there was a monotonic response. Third, almost no other information about factors that potentially affect sperm concentration was obtained by the investigators. And finally, even in the highest intake group, soy intake averaged only about ½ serving daily, a relatively small amount compared to the amounts shown to exert effects in clinical studies. That such a low exposure was linked with an effect raises questions about the biological plausibility of the findings. And, even if these findings are valid, they likely have no implication for fertility since sperm concentration decreased primarily among men with an above average sperm concentrations.

In any event, definitive conclusions about the impact of soy on sperm can be based only on the results from clinical (intervention) studies. Three such studies, two published as a full manuscript and one described in the proceedings from a scientific meeting, have evaluated the effects of soy or isoflavones on sperm quality or quantity. In one of the studies, healthy volunteers took a daily supplement containing 40 mg isoflavones for two months. They donated blood and semen samples monthly starting two months before and ending four months after supplementation.[147] Semen samples were analyzed for ejaculate volume, sperm concentration, total sperm count, motility and morphology. In addition, testicular volume was measured. As expected, plasma isoflavone levels increased markedly following supplementation, but there was no effect on hormone measurements, testicular volume or semen parameters over the study period.

In agreement with these findings is a crossover study involving 32 healthy young men who consumed diets in random order for 57 days which were supplemented with milk protein isolate or isolated soy protein containing a high or low amount of isoflavones.[148] Analysis of semen samples collected on days 1 and 57 of each treatment period revealed no significant effects of diet on semen parameters including semen volume, sperm concentration, sperm count, total motile sperm count, sperm motility or sperm morphology. In the third study, 20 volunteers were randomized to three different groups in which they were provided 60, 320 or 480 mg/day isoflavones for three months.[149] When compared to baseline, there were no statistically significant differences in ejaculate volume, sperm concentration, count and motility of spermatozoa in men given isoflavones.

Interestingly, a case report described a benefit from isoflavone supplementation in a male with low sperm concentration who was unable to father a child. Daily isoflavone supplementation for six months led to normalization of sperm quality and quantity and to the birth of a healthy infant.[150] As a result, the authors of this report suggested that isoflavones may be a treatment for low sperm concentration.

Finally, there are two case reports in the literature describing feminizing effects that allegedly occurred as a result of soyfood consumption.[151] In one, a 60-year-old man developed gynecomastia likely as a result of a dramatic rise in circulating estrogen levels. These levels were 10-fold higher than the levels following discontinuation of soy consumption. In the other, a 19-year old male vegan developed low testosterone levels, loss of libido and erectile dysfunction.[152]

If soy consumption was in fact responsible for the observed feminizing effects it is because such excessive amounts were consumed in the context of unbalanced and likely nutrient-deficient diets. Both men, coincidentally, reportedly ingested 360 mg/day isoflavones, an intake about 10-fold higher than is typical for Japanese men consuming a traditional diet. In fact, in the vegan male, soy accounted for the vast majority of calories consumed. Furthermore, in contrast to the rise in estrogen levels noted in the 60-year-old man, numerous clinical studies in which men are exposed to as much as 150 mg/day isoflavones, have shown that neither soyfoods nor isoflavone supplements increase levels of this hormone.[153] And as already discussed, the clinical data show that neither soy nor isoflavone supplements affect testosterone levels. These case reports simply illustrate that potentially consuming excessive amounts of essentially any food can lead to abnormalities and nutrient intakes above established upper safe limits.

How Much Soy Protein do Asians and Americans Consume?

There is confusion about the role soy plays in the diets of Asian populations and precisely how much soy Americans consume. Soy protein is widely used by the food industry and is found in small amounts in an extensive array of foods in the United States. However, soy protein is added to foods primarily for functional purposes, i.e., to improve shelf stability and texture. Consequently, U.S. daily per capita soy protein intake is only 1 to 2 g/day. That amount represents about 2% of total protein intake.[154] Obviously, because soy protein intake is so low, U.S. isoflavone intake is also very low (~2 mg/day).[155] Furthermore, although each gram of protein in minimally processed or traditional soyfoods is associated with about 3.5 mg isoflavones, the protein used by the food industry is often quite low in isoflavones.

In Japan, the daily intake of soy protein among those consuming a traditional diet is approximately 10 g, which represents more than 10% of their total protein intake.[4] Large studies from Shanghai, China, show that men consume about 12 to 13 g of soy protein per day,[156] which represents about 15% of total protein intake,[157] and that women consume about 9 g/day.[158] Individuals in the upper one-quarter of intake consume about 15 to 20 g soy protein daily. Ten grams soy protein translates to about 1.5 servings since 1 serving of a traditional soyfood provides about 7 g protein although some soyfoods can provide considerably more than this amount.

In older men, dietary protein intakes above the RDA may help prevent sarcopenia or age-related loss in skeletal muscle. Researchers recommend the consumption of at least 30 g of protein at each of the three primary meals. Soyfoods can play important roles in helping men meet protein needs.

Approximately half of the soy intake in Japan comes via unfermented foods, with four foods – tofu, miso, natto and fried tofu – accounting for nearly 90% of all soy consumption.[159, 160] In Shanghai, most of the soy consumed is unfermented, and soymilk, tofu and processed soy products other than tofu account for about 80% of total soy consumption.[161]

Summary and Conclusions

Soyfoods can play an important role in the diets of men. They provide high-quality protein and are generally low in saturated fat, making most soyfoods excellent choices for men who want to increase protein intake from healthful foods. In addition, soyfoods are heart-healthful; they have a beneficial fatty acid profile and soy protein modestly lowers cholesterol levels. Soy isoflavones may have a number of other coronary benefits. More speculative evidence indicates that soyfoods, perhaps because they contain isoflavones, help reduce risk of prostate cancer. Finally, there is no meaningful clinical evidence that suggests soy protein lowers serum testosterone levels or exerts any estrogen-like or feminizing effects in men.

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