

Data Indicate Soy Consumption Does Not Feminize Men

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Overwhelming evidence indicates that neither soy, nor the isoflavones in soy, feminize men when consumed as part of a healthy lifestyle.

In 2018, [meta-analysis](#) of 30 observational studies found that soy intake was associated with a lower risk of having prostate cancer.¹ Those findings were cited in a recent [article](#) by Samantha Cassetty, RD, that included soy as one of seven foods men should consume for a longer life. However, the article also hyperlinked to an article written in June 2019, which highlighted a 2008 study that found daily soy consumption was associated with lower sperm concentration.² Since more than a decade after its publication this study continues to be cited as evidence of potential harm associated with soyfoods, it warrants a closer look, as do studies relevant to this research area.

As way of background, there has been rising apprehension that environmental estrogens play a role in the declining sperm count occurring among men worldwide.³⁻⁵ Since soy is a uniquely rich source of isoflavones, naturally occurring compounds classified as phytoestrogens, the soy/sperm relationship has received attention.

The 2008 research cited previously was a U.S. pilot case-control study by Chavarro et al.,² which found soy intake was associated with lower sperm concentration among 99 males in subfertile couples treated at a fertility center. However, about half of the decreased sperm concentration resulted from the higher ejaculate volume in the fourth (4.1 ml) compared to the first (3.5 ml) soyfood intake quartile. In fact, total sperm *count* was only reduced by ~10% when comparing extremes of soy intake, a decrease which was not statistically significant; nor was there an effect of soyfood intake on sperm motility or morphology. Since there is no biological basis for soy increasing ejaculate volume, the observed association between soy and sperm concentration lacks credibility. A closer look at the data raises some additional doubts.

In multivariate analyses, men in the highest soyfood intake category (cutoff; ³0.30 servings/d, median isoflavone intake, 13.5 mg/d) had on average 41 million sperm/ml fewer than men who did not eat soyfoods (p=0.02). Men in the second soyfoods intake category had 24 million sperm/ml less than men who did not eat soyfoods even though the range for this intake category was 0.01 to 0.07 servings/d (median isoflavone intake, 0.85 mg/d), an amount of soy that is highly unlikely to exert a biological effect. For comparison, there are about 25 mg isoflavones in a cup of soymilk made from whole soybeans.

Finally, a follow up study by the research group responsible for the 2008 study, which involved 184

men from couples undergoing infertility treatment with in vitro fertilization, found that male partners' intakes of soyfoods and soy isoflavones were unrelated to fertilization rates, proportions of poor quality embryos, accelerated or slow embryo cleavage rate, and implantation, clinical pregnancy and live birth.⁶

The results of observational studies are often used as a basis for generating hypotheses that can be tested in intervention studies, since the latter are the only type of study that allows cause and effect relationships to be established. Three studies, two published in full manuscript form and one described in the proceedings from a scientific meeting, have examined the impact of soy or isoflavones on sperm and semen parameters. None of the studies reported any adverse effects. In one, healthy volunteers took a placebo or a daily supplement containing 40 mg isoflavones for two months.⁷ In another, which utilized a cross-over design, 32 healthy young men consumed diets in random order for 57 days which were supplemented with milk protein isolate or soy protein that provided either 0.02 or 0.75 mg/kg body weight per day.⁸ In the third study, 20 volunteers were randomized to three different groups in which they were provided 160, 320 or 480 mg/d isoflavones for three months.⁹

Before concluding, it is worthwhile to consider the impact of soy on hormone levels in men, and specifically, levels of testosterone and estrogen. Not so much because low serum levels of testosterone cause infertility, but because claims that soy causes male feminization typically focus on the effects of soy on both sperm production and hormonal disruption. Having said this, although men with low testosterone can still produce healthy sperm (sperm production is mainly stimulated by other hormones), low levels of testosterone may result in decreased sperm production. One study found that up to 30% of men with fertility issues and sperm concentration below 20 million sperm per milliliter presented with biochemical signs of hypogonadism, that is, low serum testosterone and/ or high luteinizing hormone.¹⁰

In any event, a 2010 meta-analysis of clinical studies found neither soy nor isoflavones affect testosterone levels.¹¹ And a narrative review published in that same year concluded soy does not affect estrogen levels in men.¹² In agreement, a recently submitted manuscript that meta-analyzed the clinical data found no effects of soy on testosterone or estrogen levels in men.

In conclusion, based on the lack of effect on sperm production and hormone levels, evidence indicates that neither soy, nor the isoflavones in soy, feminize men.

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