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Soy foods are associated with lower sperm concentrations

Men who eat an average of half a serving of soy food a day have lower concentrations of sperm than men who do not eat soy foods, according to research published online in Europe's leading reproductive medicine journal, *Human Reproduction*, today (Thursday 24 July). The association was particularly marked in men who were overweight or obese, the study found.

In the largest study in humans to examine the relationship between semen quality and phytoestrogens (plant compounds that can behave like the hormone, oestrogen), Dr Jorge Chavarro, a research fellow in the department of nutrition at Harvard School of Public Health, Boston, USA, and his colleagues found that men who ate the most soy food had 41 million sperm per millilitre less than men who did not consume soy products. (The "normal" sperm concentration for men ranges between 80-120 million/ml).

Isoflavones (daidzein, genistein and glycitein) are plant-derived compounds with oestrogenic effects that are found mainly in soy beans and soy-derived products. Animal studies have linked the high consumption of isoflavones with infertility in animals, but so far there has been little evidence of their effect in humans.

Dr Chavarro and his colleagues analysed the intake of 15 soy-based foods in 99 men who had attended a fertility clinic with their partners to be evaluated for sub-fertility between 2000 and 2006. They asked them how often and how much they had eaten in the previous three months; the foods included tofu, tempeh, tofu or soy sausages, bacon, burgers and mince, soy milk, cheese, yoghurt and ice cream, and other soy products such as roasted nuts, drinks, powders and energy bars.

Different foods have different levels of isoflavones in them, and so the researchers related the size of the serving to the particular food. For instance, a standard serving of tofu was 115g and for soy milk it was one cup (240 millilitres).

The men were divided into four groups according to their intake of soy foods and isoflavones. After adjusting for factors such as age, abstinence time, body mass index (BMI), alcohol and caffeine intake and smoking, Dr Chavarro found that men in the highest intake category had, on average, 41 million sperm/ml less than men who did not eat soy foods. "Men in the highest intake group had a mean soy food intake of half a serving per day: in terms of their isoflavone content that is comparable to having one cup of soy milk or one serving of tofu, tempeh or soy burgers every other day," he said.

"It is important to highlight that the figure of half a serving a day is the average intake for men in the highest intake group. Some men in this group had intakes of soy foods as high as nearly four servings per day."

The researchers found evidence that the association between soy food intake and sperm concentrations were stronger in men who were overweight or obese (and 72% of them were). They also found the relationship between soy foods and sperm concentration was strongest in men with the higher sperm concentrations. "The implication is that men who have normal or high sperm counts may be more susceptible to soy foods than men with low sperm counts, but this remains to be evaluated," explained Dr Chavarro.

The study does not reveal why soy foods have this effect on sperm, but Dr Chavarro speculates that increased oestrogenic activity may have an adverse effect on the production of sperm by interfering with other hormonal signals. This effect could be strengthened further in overweight and obese men because men with high levels of body fat produce more oestrogen than slimmer men, leading to high overall levels of oestrogen in the body and reproductive organs.

Soy foods are the most important source of phytoestrogens in people in the Western world, and the researchers say they were able to comprehensively assess the men's soy intake. They did not assess intake of isoflavones from other sources, such as bakery products made with soy flour. "However, the most likely effect of not assessing intake of these foods is that the associations reported in this study are attenuated," said Dr Chavarro.

The researchers say that the clinical significance of their research remains to be determined, and further randomised trials are needed.

(ends)

[1] Soy food and isoflavone intake in relation to semen quality parameters among men from an infertility clinic. *Human Reproduction*. Published online under advance access. doi:10.1093/humrep/den243.

Notes:

A pdf of the research paper is available at: <http://www.oxfordjournals.org/eshre/press-release/freepdf/den243.pdf>
or from Emma Mason.

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