

## CHILDREN'S ENVIRONMENTAL HEALTH CENTER OF THE HUDSON VALLEY

[MARIA FARERI CHILDREN'S HOSPITAL AT WESTCHESTER MEDICAL CENTER](#)

PROTECTING CHILDREN AGAINST ENVIRONMENTAL THREATS

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**MARCH 7, 2011 - CHILDREN'S HEALTH ADVISORY – SOY & CHILDREN'S HEALTH**

**March 7, 2011:** Soy is a plant native to Southeast Asia, and has been a part of Asian diets for at least five thousand years. Tofu was apparently invented in China almost two thousand years ago! Only in the last sixty years has soy become popular in the United States, and it has rapidly become ubiquitous in our supermarkets.

[Dr. Agnes Banquet](#), Assistant Director of the [Children's Environmental Health Center of the Hudson Valley](#) said: "Soy contains protein, fiber, and a group of chemicals called isoflavones; and all three ingredients have possible health benefits and risks. Soy is an excellent source of all of the amino acids we require to form proteins, and there are many potential benefits of increasing fiber in our diet. For instance, it is clear that adding soy to a diet can lower cholesterol levels."

The most controversial ingredients in soy are the isoflavones, as both potential benefits and risks have been ascribed to these chemicals. Some studies suggest they have anti-oxidant properties, which could help decrease chronic inflammation and even potentially reduce the risk of cancer and heart disease. Many studies have examined the relationship between soy isoflavones and breast cancer but the jury is still out. As of this writing, it appears that a soy rich diet may actually reduce the risk of breast cancer in asian, though not necessarily in women of other genetic backgrounds. Ironically, since soy isoflavones have a somewhat similar chemical structure to estrogen, a naturally occurring hormone, there is also a theoretical concern for women who have cancers that are stimulated by estrogen. Perhaps soy isoflavones, often referred to as phytoestrogens, in high doses, could encourage the growth of such tumors.

### **What are some of the other health benefits of soy?**

It has been suggested that adding soy protein to our diets may reduce cardiovascular disease, slow osteoporosis, improve exercise performance, and perhaps reduce the incidence of prostate cancer in some men. None of these claims are fully substantiated.

### **What about soy and asthma?**

Since soy isoflavones such as genistein have antioxidant properties, perhaps they may help asthma, which we now understand often produces chronic inflammation in the bronchial tubes (airways). Currently, our center is part of multicenter network of asthma clinical research centers supported by both the American Lung Association and the National Institutes of Health, participating in a clinical trial of genistein in asthmatics twelve years of age and older. The purpose of this study is to test the hypothesis that patients with symptomatic asthma have improved lung function and asthma control when treated with a soy isoflavone dietary supplement.

**Are there risks to eating too much soy?**

In 2009, Scientific American published an article titled “*Could Eating Too Much Soy Be Bad for You?*” New studies suggest that eating large amounts of soy’s estrogen-mimicking compounds could potentially reduce fertility in women, trigger early puberty and disrupt development of fetuses and children.

Soy is ubiquitous in the American diet. Over a quarter of all infant formula sold is made with it, and the U.S. Food and Drug Administration promotes it in foods to reduce the risk of heart disease. School lunch programs across the country are even adding soy to hamburger patties.

Many of soy’s health benefits have been linked to isoflavones—plant compounds that mimic estrogen. But animal studies suggest that eating large amounts of those estrogenic compounds might reduce fertility in women, trigger premature puberty and disrupt development of fetuses and children.

Most studies looking at the hormone-disrupting properties of genistein, the main isoflavone in soy, have been conducted in rodents. It is not yet known if these are relevant to humans.

*“We know that too much genistein is not a good thing for a developing mouse; it may not be a good thing for a developing child,”* said Retha Newbold, a developmental biologist at the National Institute of Environmental Health Sciences. More definitive answers, she said, may lay ahead in future long-term human studies.

With approximately 20–25% of U.S. infants receiving at least some soy-based formula in their first year and with 25% of Americans consuming soy foods or beverages at least once per week, one has to wonder what the developmental effects are, if any, soy has on children, especially infants.

To understand the current state of research and suggested guidance on this matter we looked at the following recent reviews of evidence:

**2008: American Academy of Pediatrics**

In May 2008, the American Academy of Pediatrics (AAP) released an updated policy statement on the use of soy protein-based formulas (Bhatia and Greer 2008).

The report points out that despite past concerns, ***there is NO conclusive evidence from animal, adult human or infant populations that soy protein in infant formulas adversely affects human development, reproduction or endocrine function.*** This includes the small amounts of isoflavones in these formulas, which have been linked to adverse effects on endocrine and reproductive function in animal models.

The overall conclusion of the AAP was that although isolated soy protein-based formulas may be used to provide nutrition for normal growth and development in term infants, there are very limited indications for their use in place of cow milk-based formula.

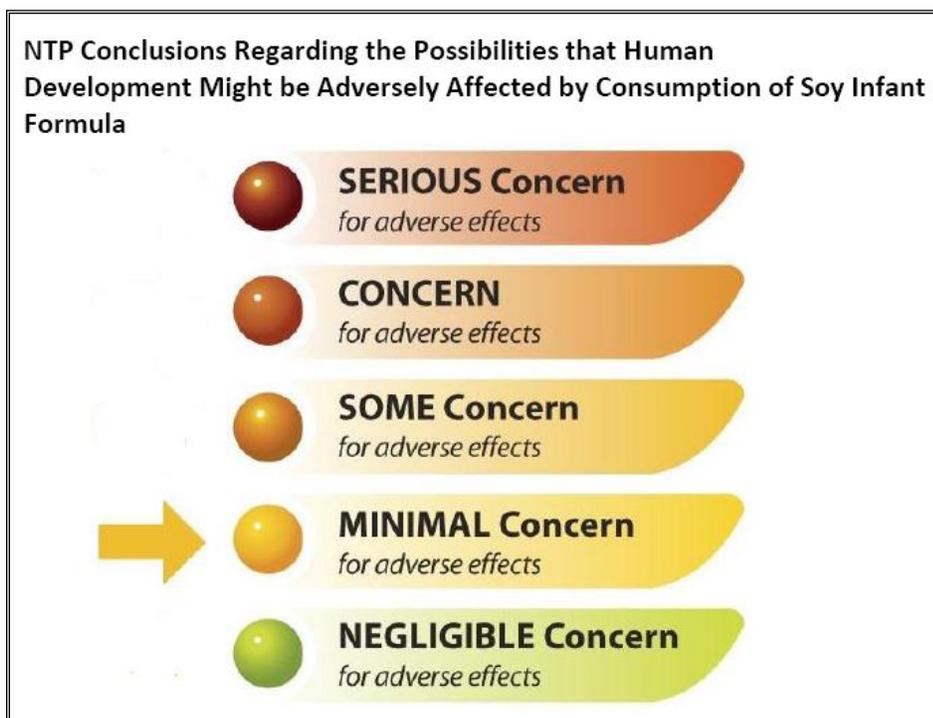
The only circumstances under which the AAP recommends the use of soy infant formula are instances where 1) the family prefers a vegetarian diet or for the management of infants with galactosemia, 2) primary lactase deficiency (rare), or 3) parental preference for vegetarianism.

Soy infant formula is not currently recommended for routine use in preterm infants by the AAP or the European Society for Pediatric Gastroenterology, Hepatology and Nutrition (ESPGHAN) Committee on Nutrition.

**2010: National Institute of Environmental Health Sciences, National Toxicology Program (National Institutes of Health)**

In 2010, the National Institute of Environmental Health Sciences, National Toxicology Program (NTP), issued its Draft Brief on Infant Soy Formula. NTP gathered an expert panel to evaluate the current scientific evidence on soy infant formula and the potential developmental toxicity of its major isoflavone components, including genistein.

The panel concluded that *there is minimal concern for adverse effects on development in infants who consume soy infant formula*. This level of concern represents a “2” on the five-level scale of concern used by the NTP as shown in this chart.



The NTP panel found that existing epidemiological literature on soy infant formula exposure is insufficient to reach a conclusion on whether soy infant formula does or does not cause adverse effects on development in humans.

They did find “clear evidence” for adverse effects of genistein on reproductive development and function in female rats and mice (e.g. accelerated puberty). They also found evidence that infants fed with soy infant formula can have blood levels of total genistein that exceed those measured in neonatal rodents following treatment with genistein at dose levels that induced adverse effects in the animals.

However, the NTP accepts the conclusions of the expert panel that the current literature in laboratory animals is limited in its utility for reaching conclusions for infants fed with soy infant formula. Thus, the NTP is initiating a series of studies to address several of the limitations in the laboratory animal studies identified by the expert panel.

### **Conclusions**

Based on current research, there is no conclusive evidence that the consumption of soy or soy formula harms infant development, reproduction or endocrine function. Unfortunately we also cannot say with certainty that there are no adverse effects because of a lack in relevant research in children. One of the key unresolved questions is whether there may be specific risks in the fetus or early childhood when organs are forming.

### **Sources**

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With office locations conveniently located in Westchester County and several other sites in the Hudson Valley, the [Children's Environmental Health Center of the Hudson Valley](#) provides clinical consultations for children and their families by appointment.

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