

# Soyfoods Association of North America

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## Talking Points *Soy and Thyroid*

**Updated:** February 2012

### Issue:

News reports have been made that the consumption of soy isoflavones and soyfoods may reduce thyroid hormone levels and cause thyroid cancer. A review of human research trials and review articles published in peer-reviewed journals since 1998 indicates that soyfoods do not have significant effects on thyroid function in individuals with a normal functioning thyroid. Although soyfoods and isoflavones may reduce thyroid hormone levels, the results do not show clinical evidence of disease. The following provides highlights from some critical studies reviewed.

### Talking Points:

1. A recent review of 14 clinical trials with healthy men and women concluded that consuming soyfoods or isoflavones had either no effects or only very modest changes within normal range of thyroid function. Participants in these trials consumed adequate amounts of iodine common in the American diet. In animal studies linking soy or isoflavone consumption to developing goiter, iodine deficiencies were present.<sup>1</sup>
2. Extensive research in humans has failed to find an impact of soyfood or soy isoflavone consumption on thyroid function in pregnant women,<sup>2</sup> children with hypocholesterolemia,<sup>3</sup> and healthy post-menopausal women.<sup>4</sup>
3. When isoflavones were fed at a relatively high dose (75 mg) per day for 12 weeks, women who had undergone ovariectomies did not have significant changes in thyroid parameters, and modest reductions in T<sub>3</sub> levels were considered to be harmless. The authors concluded the slight reduction in free T<sub>3</sub> levels to be clinically unimportant.<sup>5</sup>
4. Similarly in hypercholesterolemic, postmenopausal women taking high amounts (56 and 90 mg) of isoflavones experienced small increases in thyroid hormones; however, the author suggests that changes in values are not likely clinically significant.<sup>6</sup> In a systematic review and meta-analysis looking at postmenopausal women, soy isoflavones showed no effect on TSH or T<sub>4</sub> levels and there was insufficient data to determine effects on T<sub>3</sub>.<sup>7</sup>

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<sup>1</sup> Messina M and Redmond G. Effects of Soy Protein and Soybean Isoflavones on Thyroid Function in Healthy Adults and Hypothyroid Patients: A Review of the Relevant Literature. *Thyroid*. 2006; 16:3, 250-258.

<sup>2</sup> Li J, Teng X, Wang W, Chen Y, Yu X, Wang S, Li J, Zhu L, Li C, Fan C, Wang H, Zhang H, Teng W, Shan Z. Effects of dietary soy intake on maternal thyroid functions and serum anti-thyroperoxidase antibody level during early pregnancy. *J Med Food*. 2011 May;14(5):543-50.

<sup>3</sup> Zung A, Shachar S, Zadik Z, Kerem Z. Soy-derived isoflavones treatment in children with hypercholesterolemia: a pilot study. *J Pediatr Endocrinol Metab*. 2010 Jan-Feb;23(1-2):133-41.

<sup>4</sup> Teas J, Braverman LE, Kurzer MS, Pino S, Hurley TG, Hebert JR. Seaweed and soy: companion foods in Asian cuisine and their effects on thyroid function in American women. *J Med Food*. 2007 Mar;10(1):90-100

<sup>5</sup> Mittal N, Hota D, Dutta P, Bhansali A, Suri V, Aggarwal N, Marwah RK, Chakrabarti A. Evaluation of effect of isoflavone on thyroid economy & autoimmunity in oophorectomised women: a randomised, double-blind, placebo-controlled trial. *Indian J Med Res*. 2011 Jun;133(6):633-40.

<sup>6</sup> Persky VW, Turyk ME, Wang L, Freels S, Chatterton R Jr, Barnes S, Erdman J Jr, Sepkovic DW, Bradlow HL, Potter S. Effect of soy protein on endogenous hormones in postmenopausal women. *Am J Clin Nutr*. 2002 Jan;75(1):145-53.

<sup>7</sup> Hooper L, Ryder JJ, Kurzer MS, Lampe JW, Messina MJ, Phipps WR, Cassidy A. Effects of soy protein and isoflavones on circulating

5. Women with subclinical hypothyroidism had an increased risk of progressing to overt hypothyroidism after receiving a 30 gram soy protein supplement containing 16 mg isoflavones. However, 16-mg soy phytoestrogen supplementation significantly reduced insulin resistance and blood pressure in these patients. No changes were seen in blood cholesterol in these subclinical hypothyroid individuals.<sup>8</sup>
6. When soy has a negative impact on thyroid function, other factors besides soyfood and soy isoflavone intake must be present, including iodine deficiency, other defects of hormone synthesis, or additional goitrogenic dietary factors, ( whole grain breads and cereals, broccoli and cauliflower, as well as, iron and calcium supplements).<sup>9</sup> It is important to note that often when thyroid hormone levels change, they may remain within the normal range and, therefore, do not demonstrate clinical evidence of disease. Also it is important to consider that when assessing thyroid lab results, reference ranges may differ among different laboratories.<sup>10</sup>
7. A recent review of human health research found that soy users who had ample iodine in their diet were not at increased risk for thyroid problems or goiter. In fact, the findings of a recent human study suggest that consumption of both traditional and modern soyfoods is associated with a reduced risk of thyroid cancer.<sup>11</sup> Thyroid cancer is uncommon, accounting for less than 2% of all new cancer cases in the U.S. each year. According to the American Thyroid Association, people over the age of 35 should check thyroid hormone levels every five years.
8. Thyroid dysfunction may be linked to hypothyroidism, hyperthyroidism, goiter, or thyroid cancer. In hypothyroidism, the thyroid produces too little hormone and leads to feeling cold or tired and having dry skin and hair, constipation, muscle cramps, or weight gain. Hyperthyroidism, when the thyroid produces too much hormone, is also known as Graves' disease. Symptoms of hyperthyroidism include weight loss, nervousness, irritability, increased perspiration, a racing heart, hand tremors, anxiety, difficulty sleeping, increased bowel movements, fine brittle hair, and muscular weakness. Both hypo- and hyperthyroidism and iodine deficiency can enlarge the thyroid, called a "goiter."
9. Like other plant foods that contain goitrogens, soy can be part of a healthy diet. There is a chance that soy, other high-fiber foods, and certain dietary supplements may interfere with medication for hypothyroidism. Individuals treated for hypothyroidism can consume soyfoods safely, but should discuss their diets with their physician,<sup>12</sup> and monitor levels of thyroid hormone in the blood to ensure that an appropriate level of medication is prescribed. Another strategy is to time the medication between meals, so that the chemical components in food do not interfere with the actions of the medicine.

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hormone concentrations in pre- and post-menopausal women: a systematic review and meta-analysis. *Hum Reprod Update*. 2009 Jul-Aug;15(4):423-40.

<sup>8</sup> Sathyapalan T, Manuchehri AM, Thatcher NJ, Rigby AS, Chapman T, Kilpatrick ES, Atkin SL. The effect of soy phytoestrogen supplementation on thyroid status and cardiovascular risk markers in patients with subclinical hypothyroidism: a randomized, double-blind, crossover study. *J Clin Endocrinol Metab*. 2011 May;96(5):1442-9.

<sup>9</sup> Doerge DR, Sheehan DM. Goitrogenic and estrogenic activity of soy isoflavones. *Environ Health Perspect*. 2002 Jun;110 Suppl 3:349-53.

<sup>10</sup> MedlinePlus. TSH test. Available at <http://www.nlm.nih.gov/medlineplus/ency/article/003684.htm>. Accessed 7 March 2012.

<sup>11</sup> Horn-Ross PL, Hoggatt KJ, Lee MM. Phytoestrogens and Thyroid Cancer Risk: The San Francisco Bay Area Thyroid Cancer Study. *Cancer Epidemiol Biomark Prev*. 2002; 11: 43-9.

<sup>12</sup> Messina M, Redmond G. Effects of soy protein and soybean isoflavones on thyroid function in healthy adults and hypothyroid patients: a review of the relevant literature. *Thyroid*. 2006 Mar;16(3):249-58.

**Scientific Experts:** Please direct media calls to researchers in this field of study.

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