

The Miracle Mineral, Part Two

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Last month, I discussed the important role of iodine in thyroid, gastrointestinal and cognitive health. I also reviewed common causes of iodine deficiency such as salt-restricted diets; low iodine levels in the soil; intake of goitrogens (foods that reduce iodine uptake and utilization) and intake of other halogen elements including fluorine, chlorine and bromine, which compete with iodine for uptake from the intestines. This month, I will discuss the role of iodine in breast and prostate tissue and the significance of iodine in optimizing breast and prostate health.

Iodine and Breast Health

Breast tissue expresses the sodium/iodide symporter (NIS), which allows for uptake of iodine. Research indicates that iodine is required for normal growth and development of breast tissue, and is concentrated in breast milk. The NIS has been shown to be active in lactating breast tissue, breast cancer and benign fibrotic breast changes.¹ Evidence suggests that the high intake of iodine in Japanese women, likely due to seaweed in the diet, is associated with the low incidence of benign and cancerous breast diseases in these women. Animal and human studies have shown that iodine supplementation exerts a suppressive effect on both the development and size of benign growths as well as neoplasms in breast tissue.²

Table 1. Health Issues Linked to Iodine Deficiency

- Hypothyroidism
- Goiter (Enlarged Thyroid Gland)
- Cognitive Disorders
- Neurological Disorders
- ADHD
- Fibrocystic Breasts
- Breast, Prostate and Stomach Neoplasms
- Iodine deficiency during pregnancy can result in numerous complications as well as severe neurological defects and cretinism (severely stunted physical and mental growth)

Breast cancer is one of the most common cancers among women, second only to skin cancer. In addition, breast cancer is the second leading cause of cancer death in women. Currently, it is estimated that the lifetime risk of developing invasive breast cancer in American women is one in eight.³ Research indicates that iodine deficiency is associated with elevated risk of breast, endometrial and ovarian cancer.⁴ Studies show that iodine deficiency in breast tissue can cause cellular changes and abnormal growths. In addition, iodine-deficient breast tissue is more susceptible to the action of certain carcinogens and promotes lesions earlier and in greater profusion. There is also evidence that iodine-deficient breast tissue exhibits changes such as estrogen receptor proteins, which may play a role in mutagenesis.⁵⁻⁶ Furthermore, studies have demonstrated that in some human breast cancer cell lines, iodine inhibits induction and proliferation, and induces programmed cell death (apoptosis), as well as provides antioxidant activity.⁷⁻⁸ Also, it is well established that iodine deficiency is associated with thyroid dysfunction, and there is a strong correlation between breast abnormalities and thyroid disease, which suggests a possible common link such as iodine.⁹⁻¹⁰

Fibrocystic Breasts

Fibrocystic breasts, also known as fibrocystic changes or fibrocystic breast condition, is a benign (non-cancerous) condition in which breast tissue undergoes changes resulting in fibrosis and cysts. Fibrocystic breast disease is the most common benign breast disease and affects over half of all women.¹¹ This condition generally affects women between 20 and 50 years of age, and it is characterized as lumpy, heavy, painful or tender breasts, and often occurs just prior to the onset of the menstrual period. Some research suggests that fibrocystic breast disease increases the risk of developing breast cancer. One study showed that women with fibrocystic breasts had 7.4 times the risk of developing breast cancer compared to women without fibrocystic disease.¹²

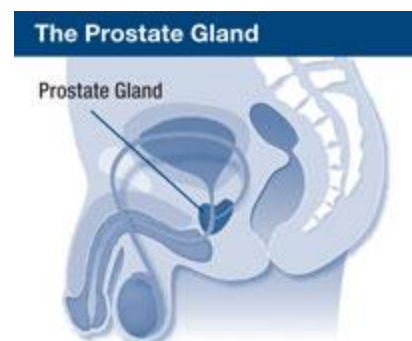
Evidence suggests that fibrocystic breast disease is associated with iodine deficiency. Animal models have shown that blocking iodine uptake results in abnormal tissue changes such as intralobular fibrosis and cystic changes resembling human fibrocystic disease, as well as pre-cancerous lesions.¹³⁻¹⁴ A randomized, double-blind, placebo-controlled clinical trial showed that iodine supplementation can improve painful breasts (mastalgia). This study demonstrated that supplementation with 3 or 6 mg/day of iodine for 6 months significantly decreased breast pain reported by the patients. In addition, physician assessment of pain, tenderness and nodularity also improved. The results showed that the subjects reported improvements in pain by month 3 of the study, and over 50 percent of patients receiving 6 mg/day reported significant overall pain reduction.¹⁵

A review of 3 studies supplementing iodine for fibrocystic breast changes revealed similar results.¹⁶ In one study, 233 subjects received sodium iodide for 2 years and 588 subjects received protein-bound iodide for 5 years. The results showed that 70 percent of the subjects treated with sodium iodide had clinical improvement in their breast disease and 40 percent of subjects treated with protein-bound iodide had clinical improvement. In the second study, 108 subjects were supplemented with iodine plus 145 subjects from the first study that were treated with protein-bound iodide without improvement were switched to iodine at a dose of 0.08 mg/kg. This study found that 74 percent of subjects that had been switched to iodide had clinical improvement, and objective improvement was reported in 72 percent of those supplemented with iodine throughout. In the third study, 23 subjects received iodine at a dose of 0.07 to 0.09 mg/kg body weight and 33 subjects were given an aqueous mixture of brown vegetable dye and quinine as the control group. In the subjects who received iodide supplementation, 65 percent reported subjective and objective improvement.

Iodine and the Prostate

Iodine may also play a role in prostate health. Currently, prostate cancer is the second most common cancer among men, second only to skin cancer. The American Cancer Society reports that 1 in 6 American men will be diagnosed with prostate cancer during their lifetime. Prostate cancer is the second leading cause of cancer death in American men; however, the five-year survival rate with prostate cancer is nearly 100 percent.¹⁷

Data from the National Health and Nutrition Examination Survey (NHANES I) Epidemiologic Follow-up Study was analyzed to determine if there was an association between iodine deficiency and prostate cancer risk. The study showed that in the individuals with the



highest iodine/creatinine ratio in urinary excretion, which was used as a marker of iodine exposure, there was a reduction in prostate cancer risk of 29 percent compared to the subjects with the lowest iodine excretion. Similarly, due to the fact that iodine is required for thyroid hormone synthesis, the study showed that individuals with a history of thyroid disease had over double the risk of prostate cancer, and those with thyroid disease for greater than 10 years had over three-times the risk of the disease.¹⁸ Researchers have demonstrated the presence of the sodium-iodide symporter (NIS) in prostate epithelial tissue.¹⁹ Furthermore, recent studies indicate that many prostate cancers express the NIS protein,²⁰ which may be the mechanism in which radioactive iodine is highly efficacious in treating prostate carcinoma.²¹

Iodine Supplementation

Iodine deficiency can be determined using a 24-hour urine iodine sufficiency test.

Oral iodine supplementation can optimize iodine levels in individuals with iodine deficiency. Iodoral[®] is an iodine supplement that contains 5 mg iodine and 7.5 mg iodide as the potassium salt, and is formulated to decrease gastric irritation and the unpleasant taste of iodine. In addition to iodine supplementation, levels of riboflavin and niacin (as found in ATP Cofactors), should also be optimized as these vitamins are important in the incorporation of iodide into cells and hormones.²²

Conclusion

The information shared in this article is a reflection of the current state of the medical literature and is intended to support healthy cellular function. Research continues to uncover the many physiological roles that iodine plays in the body. In addition to thyroid, stomach and cognitive health, iodine is also important for breast and prostate health. Supplementation of iodine can be utilized in individuals with iodine deficiency to optimize function of these tissues.

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