

Iodine Helps Prevent and Treat Breast Cancer

Many of you may have heard about the relationship between iodine and breast disease. It has been known for a while that women with fibrocystic breasts, and women who suffer from cyclic mastalgia (aka. tender breasts during menstruation), can find substantial relief by taking molecular iodine. A great source of iodine can be found in Sea Vegetable, particularly [Kelp](#). What you may not be aware of is that an iodine deficiency can lead to structural changes in breast tissue, and has even been shown to lead to an increase in breast malignancy in animal models. On the flip side iodine has been shown to reverse the development of cancer cells in chemically-induced animal cancers. Researchers have also suggested that iodine decreases early cancer progression through an inhibitory effect on cancer initiating cells.

Wow, iodine, how about that? But the question is how the iodine is protecting the breast tissue. When doctors talk about iodine they are usually doing so in reference to the thyroid gland, as 75% of the iodine in the body is found in there. Interestingly, women with breast cancer have larger thyroid glands than women without cancer. Could iodine be decreasing breast cancer risk through the action of the thyroid gland?

That is one of the questions that researchers from Drexel University College of Medicine in Philly, PA set out to answer. These people attempted to determine how the iodine was working by examining the genetic profiles of breast cancer cells which were exposed to iodine. In their study, which was performed *in vitro* (in a Petri dish), they used the estrogen responsive MCF-7 breast cancer cell lines. Breast cancer cells that are estrogen responsive (aka “estrogen positive”) have estrogen receptors on their cell surface, and are stimulated to grow and divide in the presence of estrogen (one reason that HRT post-menopause can lead to increased risk of breast cancer). Breast cancer cells can also be estrogen receptor “negative,” which implies that the cells are not as sensitive to estrogen. The classification of negative vs. positive is determined by testing done on tissue that has been removed from the body, such as in a biopsy.

Anyway, in this study they used estrogen responsive breast cancer cells and treated them with Lugol’s iodine solution. Lugol’s is 5% iodine and 10% potassium iodide. Iodine is the term used to describe “free” iodine, and iodide is used to describe iodine that is molecularly bound to something else, like potassium. What these researchers found was that 29 genes were up regulated, and 14 genes were down regulated in response to the iodine/iodide treatment. Genes are the biological entity responsible for defining traits. Remember Gregor Mendel, the priest with the peas? These genes cannot only determine which peas will be wrinkled and which will be round, but other things like eye color, or even the number and type of estrogen receptors on a breast cancer cell. This evidence, along with other data, does not suggest that the beneficial effects of iodine are mediated by the thyroid gland, and for the most part are independent of the thyroid gland.

Of the 43 genes that were affected by the iodine/iodide treatment several were involved in hormone metabolism; more were involved in the regulation of cell cycle progression, growth and differentiation. Importantly, this study found that treated cells expressed genes which regulate estrogen metabolism. One of the mechanisms that was influenced by the iodine/iodide treatment is the Cytochrome P450 system. This system, often referred to as just the “P450” system, is made up of a family of enzymes which are responsible for processing, modifying, and eliminating things from the body. The P450 system is responsible for eliminating drugs (like some types of chemotherapy), dietary chemicals (like caffeine), and substances produced within our own bodies like hormones. In the iodine study, it was discovered that there was an increase in the enzymes of the P450 system which are responsible for metabolizing estrogen into a form which inhibits cellular proliferation. This means that iodine/iodide can change the body’s estrogen into a form which inhibits abnormal cellular reproduction.

It was also found that treatment with iodine/iodide diminished the effect that estrogen had in estrogen-receptor positive cells. Specifically, treated cells showed evidence of having an activated BRCA1 gene. The BRCA1 gene, often called the “Breast Cancer Gene,” seems to be widely misunderstood. This gene is not something that promotes cancer, but something

that helps to prevent it. The BRCA1 gene is a tumor suppressor gene, and as such is used by the body to repair damaged DNA. Cancer develops from damaged DNA. BRCA1 can also influence the effectiveness of other systems throughout the body, like the P450 system. When women undergo genetic testing and are told that they have “the BRCA1 gene,” that means that they have a mutation of that gene. So, by increasing BRCA1 the iodine/iodide treatment helps to protect your DNA and thus offers some protection from the development of cancer.

Additionally, this study found that many genes which influence growth, cellular reproduction, and differentiation (a measure of a cell’s maturity or specialization- typically the lesser the degree of differentiation, the more aggressive the cancer) were impacted by the addition of iodine/iodide. Iodine/iodide treatment up-regulated genes which are responsible for preventing uncontrolled cellular division (aka cancer).

Lastly, and I have to say that besides the cancer preventative effects of iodine. This is the coolest action. Iodine/iodide treatment showed some ability to inhibit breast cancer cell’s ability to become resistant to treatments such as Tamoxifen. Tamoxifen, a SERM (selective estrogen response modifier), is an estrogen blocking drug used to treat estrogen-positive breast cancers. Unfortunately, like most cancer therapies Tamoxifen can lose its effectiveness over time. This occurs because cancer cells can change their genetics in response to their environment. Like most chemotherapy, chances are that it will work initially, but that it may become less effective over time. So, now it seems that it might be a good idea for women taking Tamoxifen to take some iodine as well.

For those who are interested the whole article “**Iodine Alters Gene Expression in the MCF7 Breast Cancer Cell Line: Evidence for an Anti-Estrogen Effect of Iodine**” article can do so by clicking [here](#).

So, if you want to prevent breast cancer, or if you already have breast cancer is then you might be asking yourself “How much, and what kind, of iodine should I take?” The RDA for iodine is 150 micrograms per day for adults. For most people this is probably a good dosage to take on a daily basis. Those with thyroid disease or who have a history of breast cancer should consider having their iodine levels checked. This can be done easily using a urine collection. Doctor’s Data is a lab which I have used which can provide this testing. For more info on Doctor's Data and how to obtain this testing please contact my office [here](#).

Iodine can cause things like rashes, nausea, headaches, or allergic reactions. However, most of these side effects are seen when people take very high doses (greater than 30 milligrams per day) over a long period of time. Some physicians believe that it takes much higher doses to cause any significant side effects. One thing I have learned in practice is that we are all physiologically unique, and what is good for one person isn’t necessarily good for another. If you would like to start taking iodine I would suggest eating foods that contain it before taking a pill. Many people will undoubtedly think that they are getting enough iodine because they eat iodized salt. The truth of the matter is that maybe they are, maybe they're not. A study published in 2008 found that 53% of iodized salt products contained less than the FDA recommended level. You can see this article [here](#).

If you like seaweed salad you’ll love this: [kombu](#), [arame](#), and kelp all contain lots of iodine. Certain types of fish also contain higher amounts of iodine. Haddock, cod, herring, halibut, and sardines are all good sources. My favorite seafood, shrimp, also contains a fair amount of iodine. Shrimp are some tasty little bugs aren’t they?

Healthy Regards,
Jake Psenka, ND

Reference website: <http://cancernd.blogspot.com/2009/01/iodine-helps-prevent-and-treat-breast.html>