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## Vitamin D and Your Health: Cancer

### Vitamin D and Breast Cancer

#### Most Common Malignancy for Women

Breast cancer is the most common malignancy of women in the western world. Many factors contribute to causing breast malignancy (it is multifactorial), though heredity is a major one. Certain diets help to prevent it, such as diets high in vegetables and fruit and low in fat. Adequate calcium is very important. The role of **vitamin D** in both the prevention and treatment of **breast cancer** is being intensively explored by scientists, and the results thus far have been promising.

No matter what cancer you have, or are trying to prevent, the question is: should cancer patients be left **vitamin D deficient**? The current research indicates the answer to this question is no, women with breast cancer should not allow themselves to be vitamin D deficient, and neither should their doctors.

If you have breast cancer, please remember that vitamin D is not a cure-all and should never be used as the main treatment for your cancer. Your oncologist will prescribe treatment that has proven efficacy and you should carefully follow their advice as the mainstay of treatment. At the same time, you should know that evidence suggests that the proper amount of vitamin D may help you in your fight against breast cancer.

#### Vitamin D In the Fight Against Breast Cancer

Next, let's look at selected studies from the scientific literature to see what clues exist about the role vitamin D may play in preventing, and treating, breast cancer.

#### Vitamin D Receptors and Calcitriol

In 1989, the prestigious medical journal, The Lancet, reported that the most active form of vitamin D (calcitriol) significantly reduced the growth of breast cancer in an animal model. Furthermore the researchers from St. Georges Hospital Medical School in London found women who had vitamin D receptor positive tumors had longer disease free intervals than

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women whose tumors had no measurable receptors for vitamin D.

Current research suggests most, if not all, women would have those **vitamin D receptors** unless they were deficient in vitamin D, that is, they would have those receptors if they were vitamin D replete. It seems as if the receptor is present in breast tissue if the most active form of vitamin D has been present and that is only the case if vitamin D's less-active form, calcidiol, has been present. In other words, if you test vitamin D deficient breast cancer patients for vitamin D receptors, they will not have many; if you treat their deficiency, they will probably develop those receptors.

Not only does **calcitriol** (the form made in optimal quantities by your body when your vitamin D blood levels are ideal) inhibit breast cancer cells from growing, it makes those cells grow and die more like natural cells. Furthermore, vitamin D inhibits the formation of excessive blood vessel growth around the cancerous tumor, a process called anti-angiogenesis.

### Sunlight Exposure Lowers Risk

In the 1990s, a group of scientists from the University of California at San Diego provided the first look at how many women may be dying needlessly from breast cancer due to low vitamin D blood levels. The researchers measured the amount of **sunlight** available to the women at the latitude where they lived and combined that with the frequency of cloudy weather, as sunny climates are associated with higher vitamin D levels. They found that women in the sunniest regions of the United States were about half as likely to die from breast cancer as were women who lived in less sunny regions. When the same researchers looked at the USSR before the country dissolved, they found that women who lived in the sunniest regions were three times less likely to develop breast cancer than were the women who lived in regions without as much sun.

In 1994, a researcher at the Memorial Sloan-Kettering Cancer Center reviewed the literature up to that date and concluded that higher intakes of **vitamin D3** and calcium might reduce breast cancer by protecting against the carcinogenic effects of a high fat diet. He also pointed out the vitamin D intakes were far below the government recommendations in force at the time.

In 1997, researchers at the Manchester Royal Infirmary discovered that women with the highest levels of calcitriol in their blood had the best prognosis. Those women with the lowest levels had a more rapidly fatal course. They also found that women with breast cancer had low levels of calcidiol in their blood with average levels of about 16 ng/mL. Women who live in sunny climates, where breast cancer is more rare, frequently have blood levels three times higher.

## Test for Calcidiol Levels, Not Calcitriol

However, studies that measure blood levels of calcitriol miss the important fact that blood levels do not reflect tissue levels. In fact, blood levels of calcitriol are quite different than tissue levels which can not be measured. However, tissue levels can be estimated from **calcidiol** levels as calcidiol is converted into calcitriol in the tissues and that conversion is directly proportional to the blood level of calcidiol. Simply put, this means that higher blood levels of calcidiol, resulting in higher tissue levels of calcitriol to fight breast cancer.

In 1999, researchers at the University of North Carolina School of Medicine reported that white women with the lowest blood levels of calcitriol were five times as likely to develop breast cancer as were women with the highest levels but the relationships did not hold for black women. More importantly, the researchers found that women with breast cancer had very low levels of calcidiol in their blood, with an average level of 15 ng/mL for white women and only 8.9 ng/mL for black women, which is severely deficient. This extraordinarily low level of calcidiol in blacks probably explained the researchers finding about calcitriol. **Blacks** were so deficient in vitamin D that their kidneys could not make enough calcitriol to compensate for their low calcidiol levels. Remember, as vitamin D deficiency worsens, the kidney activates more and more calcidiol into calcitriol to maintain serum calcium leaving very little left over for the tissues to fight cancer.

Also in 1999, researchers at the Northern California Cancer Center and the University of Miami followed 5009 women for 20 years, as part of a large NHANES I study. Of the women followed, 190 subsequently developed breast cancer. The researchers did not have data on the womens' blood calcidiol levels available, so they looked at other markers of vitamin D levels: living in sunny climates, sun damaged skin (an indication of amount of past sun exposure), a history of occupational and/or recreational sun exposure, and dietary intake of vitamin D.

## Sun Exposure Ninety-Percent of Vitamin D Intake

All of these factors reduced the risk of breast cancer. Dietary vitamin D reduced the risk a little (due to the tiny doses of vitamin D consumed) but women with high occupational and recreational sun exposure who also lived in a sunny climate reduced their risk three fold. Remember, 90% of our vitamin D comes from sun exposure. Vitamin D from diet and supplements is close to insignificant due to the small amounts consumed.

## Cholecalciferol To Elevate Calcidiol Levels

In 2002, researchers at St. George's Hospital Medical School in London reviewed the multiple mechanisms by which calcitriol prevents breast

cancer. Calcitriol arrests the aberrant progression of breast cancer by regulating cell cycles, forcing apoptosis (cell death), resists signals from substances that cause cancer cells to grow, inhibiting invasion into normal tissue, and prevents metastasis. All in all, calcitriol, the most potent form of vitamin D, appears to be the perfect chemotherapeutic agent to both prevent and treat breast cancer. Unfortunately, the researchers appeared to be unaware that the best way to elevate tissue levels of calcitriol is to elevate blood calcidiol levels. The best way to elevate calcidiol levels is to take physiological doses of **cholecalciferol**, plain vitamin D3.

### **Analogs and High Blood Calcium**

Instead of giving simple cholecalciferol to patients with breast cancer, the medical-industrial complex continued to test the potentially profitable vitamin D analogs which are patentable variations of calcitriol. The **vitamin D analogs** are chemical modifications of calcitriol which try to retain calcitriol's ability to fight breast cancer while not causing the high blood calcium that calcitriol usually causes. Several different vitamin D analogs were tested and many worked great in the test tube. However, just like calcitriol, they usually caused high blood calcium (hypercalcemia) when given to humans.

### **Vitamin D3 Not Patentable**

No one seemed to care that optimal doses of cholecalciferol would raise tissue levels of cancer fighting calcitriol quite high, would not cause hypercalcemia, and should work well against breast cancer. Remember, cholecalciferol occurs naturally, can not be patented, and is dirt cheap. Therefore, the idea that it could help breast cancer offered no financial incentives to drug companies or researchers hoping to discover a drug they could patent. Also, few of the scientists working to cure cancer had any but the most rudimentary understanding of basic vitamin D physiology, pharmacology, or toxicology.

### **Vitamin D, Calcium, and Mammograms**

Then, things started coming to a head in the last few years. In 2004, a group at the University Hospital in Quebec confirmed that vitamin D, especially when taken with calcium, significantly reduced abnormal mammograms. In fact they found women with the highest vitamin D intake had only one fourth as many abnormal densities on their mammogram as did women with the lowest intake.

### **Breast Cancer Cells Activate Vitamin D**

Researchers in Germany then tested fresh breast cancer cells to see if they could activate vitamin D. Up until then, only breast cancer cells grown in test tubes had been tested. The researchers found fresh breast cancer cells could indeed activate vitamin D. Indeed those cells seemed to be hungry for the vitamin D as the cells showed increased production of the

enzymes necessary to activate vitamin D. It seemed all that was missing was the vitamin D.

Then researchers in Norway discovered that women who were diagnosed with breast cancer during the summer and fall, the season where vitamin D levels are the highest, had the best prognosis. The researchers concluded that high vitamin D levels during the course of cancer treatment may improve the prognosis of women with breast cancer. [Colon](#) and [prostate](#) cancer showed similar improvements.

### **Vitamin D's Promise**

Since then numerous studies on the effects of vitamin D in regards to breast cancer have indicated that vitamin D3 holds great promise. Yet there is still so much more to learn about vitamin D and its relation to cancer and overall health in general. As more and more studies are performed on vitamin D with each new day, we anticipate that the future holds even more good news to come.

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