KEEPING ABREAST OF BREAST CANCER

HEALTH & WELLNESS:

by Alex Rolland

Alex Rolland and his team at Cancer Treatment Options and Management Inc. conduct personalized cancer research using worldwide scientific databases and only provide you with treatment options showing success rates higher than the standard treatment for your form of cancer and complement this with gene targeted nutraceutical dietary plans for prevention of recurrence.

The CTOAM team knows that it is highly likely that advanced treatments exist for your form of cancer which are showing improved efficiency, reduced side-effects and higher success rates over that of standard medical treatment. Identifying the right approach requires substantial background on the genetic and molecular processes unique to each case. Most physicians don't have this background. Nor do they have the time to conduct this life-saving personalized research.

If you want to improve the efficiency of upcoming treatments, prevent recurrence post-treatment, or if you have been told no further treatments exist for your cancer, contact us today at contact@ctoam.com and experience the peace of mind that comes from knowing you are doing all you can.

In this article

I'm going to share some of the latest scientific data on breast cancer and show you what the most current research has to say about which nutraceuticals and dietary changes actually have been shown to have a positive effect on breast cancer treatment. This will help to ensure that you are not taking supplements that can be harmful and that you understand a little bit more of what's going on behind the scenes, on a genetic level.

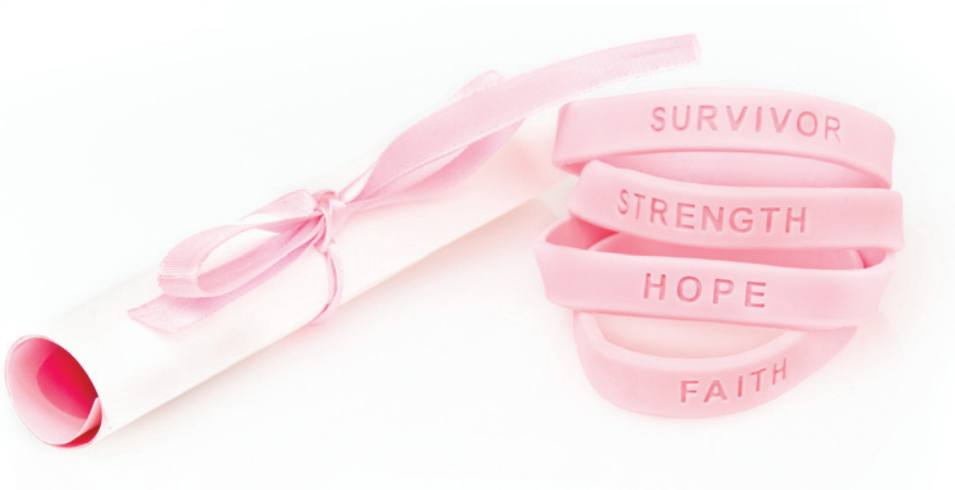
We will then delve into the processes that are unique to the different subtypes of breast cancers, and we will show you how you can improve your statistical chance of long term remission by using specific nutraceuticals to target the molecular processes unique to each subtype.

If you know anyone who has had or who has the potential to develop breast cancer, we encourage you to share this article with them and ensure they have as much information as they can.

In my article in the last edition of Encompass Magazine* I shared about how cancer develops from the stem cells that normally function to repair and replace tissues as we age. We also discussed how increased activity of the genes that cause cancer (oncogenes) and reduced activity of the genes that suppress cancer (tumor suppressors) resulted in unregulated proliferation of these stem cells leading to the disease we call cancer. We also talked about specific cancer-causing processes that support metastasis to different parts of the body.

But most importantly, we talked about how the development of drugs that target these cancer-causing processes has resulted in the identification of many substances that regulate these mechanisms, including naturally occurring nutraceuticals. In other words, once the genetic processes that cause a specific cancer have been identified, customized diets can be designed to control them. However, identifying dietary supplements that offer you the most benefit can be a daunting procedure as the science of supplements is fraught with inaccuracies and misconceptions.

For every one natural product that actually has some solid science behind it and does what it says it will there are dozens that have no scientific basis whatsoever. The supplement market is definitely rife with the modern day equivalent of snake oil salesmen. Additionally there are many cases of well-intentioned but misinformed health care providers suggesting supplements or dietary changes that may



actually have no benefit whatsoever or, often, prove to be harmful because of their influence on your body independently or because of their impact when combined with other innocently prescribed supplements or medications.

How can you know for certain that the supplement that is being recommended to you for prevention or for the support of cancer treatment, is really going to do what you need it to do and not have a detrimental impact on your treatment?

The quick answer is that you have to ensure that you have a solid understanding of the genetic and environmental factors that have influenced the development of your cancer and you have to understand how certain foods and nutraceuticals impact those genes and interact with each other. Without this information, your well-intended attempts at prevention and treatment support can actually prove to enhance the growth of tumors and/or undermine your treatment protocol.

But where do you get this understanding so you can ensure that you are helping and not hindering the maintenance of your health?

Well, if I may make an obvious pitch for our research services, that's what we're here for. CTOAM conducts personalized research for our clients to ensure that the treatment they are engaging in and any supplements they take or dietary changes they are making truly are the best course of action for the treatment of cancer and the prevention of its recurrence.

Over the last few years, we have been bombarded with information touting the cancer-fighting properties of certain vitamins, supplements or food groups. One of the biggest misconceptions regarding these claims is that if a certain nutraceutical or supplement has been found to provide a benefit in treating a specific type of cancer, then it is beneficial to all types of cancers. This could not be further from the truth!

In fact, many supplements that inhibit one type of cancer, can promote a different type of cancer. Keep in mind that there is a separate, specific molecular process driving each type of cancer. Furthermore, that specific molecular process is unique to that cancer, tissue, and stage of development. It is not a one size fits all process. To complicate the issue, every type of cancer has a variety of different molecular subtypes. So, if the supplements that you are taking are not specific to the molecular processes unique to your case, then you could actually be promoting the development of your cancer without even knowing it.

THE FOLLOWING ARE SOME RECENT EXAMPLES OF THIS PHENOMENON:

- In a recent 10-year study of more than 35,000 women, researchers discovered those who regularly took a multi-vitamin pill increased the risk of developing a tumor by 19%;

- Folic acid, often present in a potent form in multi-vitamins, may also accelerate tumor growth;

- Women who took a daily multivitamin pill had higher breast tissue density (a pre-cancerous condition), than those who took no vitamin supplements;

- Beta-carotene supplements appear to increase rates of lung cancers, particularly among smokers;

- Increased intake of supplemental vitamin E is associated with a slightly increased risk of lung cancers;

- Soy can both increase and decrease breast cancer risk depending on your genetic background.

Clearly, it is very important to understand how certain supplements will react in your body and not assume that they must be safe if they are being sold to you. Nor should we assume that if they are good for one person, they are good for you.

In each of the examples above, these supplements were being consumed by people who believed that they were doing something life-enhancing and health promoting. It can help overall to remember that nutraceuticals can act like pharmacological agents and should therefore, be used as such.

Now let's discuss the main breast cancer subtypes and the genes involved in each and then we'll explore the dietary changes and nutraceuticals that have proven to be specifically important in the treatment and/or prevention of these forms of cancer.

The Main Breast Cancer Subtypes:

Breast cancer subtypes are classified based on the presence of the estrogen receptor (ER+), the progesterone receptor (PR+), and/or the human epidermal receptor 2 (Her+), and whether the patient has undergone menopause or not. Based on these classification methods, there are three main subtypes of breast cancer:

Type A: (ER+/PR-/Her- and ER+/PR+/Her-): Driven by estrogen and or progesterone

Approximately 75% of all breast cancers are ER + and grow in response to estrogen. About 65% of these ER + breast cancers are also PR + and grow in response to estrogen and progesterone, which is similar in action to estrogen. In order to lower the chance of recurrence of this form of cancer we need to choose nutraceuticals that inhibit estrogen and progesterone, and their signalling pathways.

Type B: ER+/PR+/Her+:

About 20% to 25% of breast cancers are Her+ and grow in response to over-activation of this protein. This subtype may or may not be positive for ER and PR receptors. Although this breast cancer subtype is usually aggressive and fast growing, the monoclonal antibody Herceptin is very effective at preventing recurrence. In order to lower the chance of recurrence of this form of breast cancer, we need to choose nutraceuticals that inhibit Her and its signalling pathways.

Type C: ER-/PR-/Her-:

About 10% to 17% of breast cancers do not express any of these receptors and are referred to as triple negative. Triple-negative breast cancers are themselves a subgroup of "basal-like" breast cancers and cannot be treated with anti-hormone therapy or therapies targeted to the ER/PR hormone receptors. Although this subgroup is heterogeneous (variable) and does not have a single characterized mechanism that drives the progression, this subtype is commonly found in breast cancers with a mutated BRCA1 DNA repair gene. In order to lower the chance of recurrence, we need to choose nutraceuticals that regulate signalling pathways that are altered due to loss of BRCA1.

It's likely already becoming clear that it is very important to understand which genes are influencing your cancer in order to ensure that any treatment or supplementation that you engage in is going to have a direct impact on your form of cancer. The good news is that science has identified some compounds that are specific to each subtype. But, before we get there, let's look a little deeper into the genes and underlying mechanisms involved in the most common form of breast cancer so you'll have even more appreciation for the value of nutraceuticals.

Since the most common form of breast cancer is the estrogen and progesterone positive type A, and we have limited space here to address all forms, we will focus the remainder of this report on this breast cancer subtype.** Thus, the following is a summary of processes and genes that type A breast cancer cells depend on for their growth and survival.

An Exploration of the Genes Associated with Type A Breast Cancers:

The development of cancer involves a combination of genetic alterations that are common to all cancers, specific to each cancer type, and specific to the individual. Although cancer-signalling pathways involve many redundant players, each type of cancer relies on a specific oncogene or combination of oncogenes that cause the cancer-causing pathways to become over-activated. Since inhibiting these oncogenes usually results in death of the cancer cells, the cancers are in a sense, addicted to the oncogene. This concept is referred to as 'Oncogene Addiction', and provides us with a roadmap of potential targets for our nutraceutical diet that will kill cancer cells or prevent their further development.

As their subtype indicates, type A breast cancers develop and grow in response to estrogen, so lets take a look at how estrogen is involved in the development of these cancers.

The Effects of Estrogen on Breast Cancers:

The effect of high estrogen on breast cancer prolif-

eration and development involves a variety of processes such as increased ERα signalling, estrogen synthesis, and metabolism into toxic estrogen metabolites.

Estrogen Receptors:
The action of estrogen depends on it binding with either of its two receptors (ERα and ERβ), with ERα driving cancer development and ERβ inhibiting the effects of ERα. These breast cancers often have an increased level of ERα and a decreased level of ERβ compared with normal breast cells.

Estrogen Synthesis via Aromatase:
Estrogens are primarily produced by the ovaries however other tissues such as liver, adrenal glands, fat cells and breast tissues also produce small amounts of estrogen by androgen conversion using the enzyme aromatase. Where and how estrogen is produced, determines the type of treatment given. In pre-menopausal woman, estrogen is produced in the ovaries and breast cancer patients are typically given Tamoxifen, which blocks the ability of estrogen to bind the cellular receptor ERα. However, after menopause, the ovaries no longer act as the main source of estrogen for these cancers and the breast cancer cells and surrounding tissue over-activate the aromatase pathway. These patients are typically given aromatase inhibitors, which prevent the breast cancer cells from synthesizing the estrogen internally.

Toxic Estrogen Metabolites:
The breakdown (metabolism) of estrogen can either result in protective intermediates (2-OHE (2) via Cyp1A1, or the metabolism into toxic metabolites such as 4-OHE (2) and quinones by Cyp1B1. High levels of 2-OHE (2) protects against cancer progression while high levels of 4-OHE (2) promotes cancer progression. Increased Cyp1B1expression and decreased Cyp1A1 expression is common in Type A breast cancers.

Estrogen and DNA Repair:
Estrogen can also drive cancer development by inhibiting DNA repair genes such as BRCA1, which among other things, repairs the DNA damage caused by the toxic estrogen metabolites that result from high estrogen exposure.

Signalling Pathways and Oncogenes that Hormone Positive Breast Cancers Rely On:

There are also signalling pathways and oncogenes that type A breast cancers need in order to grow and metastasize. The following pathways and oncogenes control many cancer-causing processes in type A breast cancers.

The fact that they are over-activated in such a high percentage of these cancers, and that they play such a significant role in driving this type of cancer, makes them preferential targets for a nutraceutical diet.

- MAPK is over activated in most cancers
- PI3K/AKT over activated in 48% of relapsed Type A breast cancers
- Cyclin D1is over-activated in 50–70% of all breast cancers, but is mostly associated with hormone positive breast cancers
- NFkB is over-activated in 32% of Type A breast cancers
- PDGF-D is over-activated in 79% of Type A breast cancers

In the following section, we will discuss what nutraceuticals and foods can be used to reduce the activity of these main cancer mechanisms.

Designing a Type A Specific Nutraceutical Diet:

First, let's consider the differences between breast cancers in pre- and post-menopausal breast cancer patients. While the cancer causing pathways and genes are similar in both cases, there is an important consideration regarding estrogen.

• Pre-menopausal
Since estrogen is readily available in pre-menopausal woman and plays a key role in development of this subtype, we want to inhibit the cancer-causing estrogen receptor ERα, and increase the tumor suppressing ERβ. Furthermore, we need to reduce the build up of toxic estrogen metabolites that result from high estrogen exposure by inhibiting the Cyp1B1 and increasing Cyp1A1 levels.

• Post-menopausal
Since estrogen production is limited in post-menopausal woman, estrogen responsive breast cancer cells increase activity of the aromatase enzyme in order to continue their oncogenic estrogen signalling. In this case, we want to focus on inhibiting the aromatase enzyme.

Now that you have an understanding of the types of breast cancer and the genes involved in the most prominent form I'm going to present you with some information on the key nutraceuticals that have been proven, in peer-reviewed scientific studies, to have a direct impact on the genes involved in this form of cancer.

The following table outlines the oncogenes and signalling pathways that are over-activated in type A breast cancer and the nutraceuticals that can be used to inhibit them.

PATHWAYS	NUTRACEUTICALS
Signalling Pathways We Want To Inhibit	
PI3/AKT	DATs (garlic), Carnosol (rosemary), Quercetin (red onion), blueberries
MAPK	Quercetin
Oncogenes We Want To Inhibit	
NFkB	Carnosol, EGCG (green tea), Curcumin (Tumeric), Blueberries, Berries*, Apple extract**
Cyclin D1	EGCG/Vitamin E Resveratrol (red wine)/ Vitamin E Apple extract*
PDGFR-D	EGCG
ERα receptor	Curcumin, Carnosol
Cyp1B1	Resveratrol, Quercetin
Aromatase	Licorice, Quercetin Resveratrol, EGCG
Tumor Suppressors We Want To Inhibit	
ERβ receptor	Quercetin, Resveratrol
Cyp1A1	Curcumin, Carnosol, Quercetin

***Berries** = Raspberries, black/white currants, gooseberries, velvet leaf blueberries, low-bush blueberries, sea buckthorn and cranberry juice.
****Apple extract** = Red Delicious apples

Nutraceuticals that Boost DNA Repair:

It is important to note that the high levels of estrogen that occur in type A breast cancers can also result in a reduced ability of normal and pre-cancerous cells to repair DNA damage, so we also need to take nutraceuticals that can boost the DNA repair processes.

The development of cancer results from an accumulation of mutations due to improper or reduced repair of DNA damage. The cancer-causing genes and signalling pathways that cause the rapid growth of cancer cells can also inhibit DNA repair pathways. The result is that pre-cancerous cells with reduced ability to repair damaged DNA are sensitive to radiation and chemicals, leading to cancer.

Curcumin (from Tumeric), Concorde Grape extracts, EGCG and Quercetin all reduce the sensitivity of normal cells to radiation and chemicals by increasing DNA repair activity. Quercetin works by increasing an important component of DNA repair pathways known as p53, which is lost or inhibited in most cancers.

In Summary:

Science is clearly showing that the most effective way to treat and prevent cancer involves a daily diet of the right nutraceutical for your cancer and for the genes involved. However, it is also clear that in order to experience the maximum benefits from any dietary changes or supplementation that you make, you must ensure that you include the nutraceuticals that target the genes and pathways specific to your breast cancer subtype.

For more information on this or any other form of cancer and the latest research on treatment and prevention I welcome a call or email and would be happy to answer your questions about how you can ensure you are doing all you can.

*For a copy of the initial CTOAM article on cancer development, treatment and prevention, you are welcome to email me directly at contact@ctoam.com.

**Visit our blog @ www.ctoam.com for more detail on the genes and nutraceuticals specific to the other forms of breast cancer in the full version of this article.