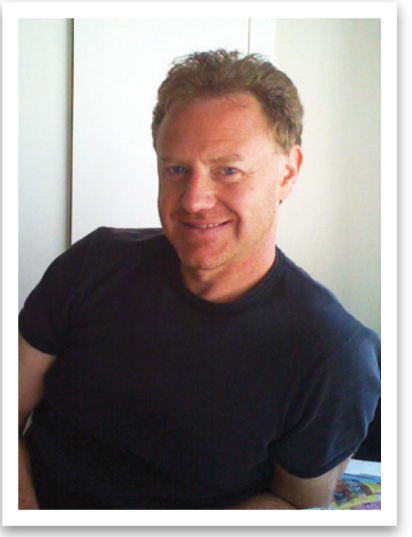
INNOVATIONS IN CANCER RESEARCH

HEALTH & WELLNESS:

What Everyone Should Know

by Alex Rolland



Cancer is a serious topic, it's true. And, it's a topic that most of us will deal with personally in some way, either through our own diagnosis and treatment or our experience of supporting a loved one through their recovery. So it's important to know as much as you can about what causes cancer, how to prevent it, and how to make sure you are getting the most effective, least invasive, treatments possible.

There is a lot to get excited about these days in the field of cancer research, treatment and prevention. You might not know this, but every day, scientific research discovers new, enhanced treatments for cancer, beyond those typically offered in our standard medical system. My team and I, at Cancer Treatment Options and Management, spend our

days exploring the most current scientific peer reviewed literature to find ***the most cutting-edge, scientifically supported treatments that are having success greater than that of standard treatments, often with fewer side effects.***

These treatments will undoubtedly become part of mainstream cancer treatment in time, but, because of the current lag time between the publication of research and the implementation of a treatment as part of the standard medical protocol, these options are not yet being included in treatment regimes, and are likely not yet even known to your doctor. The good news is that you can often access these treatments free of charge simply by sharing the research studies with your doctor and letting them know that you want to add those treatments to your protocol.

Your awareness of these treatment options and how to access them can make a huge difference to your longevity and to the lives of those you love.

However, before you can fully understand the benefit of any treatment option it is important for you to understand some basic principles of cancer development and standard treatment. I'm going to share some of these basics with you and then give you some information on some new treatment options and their outcomes. *I'm also going to show you how you can use certain naturally occurring and easily accessible plant phytochemicals to greatly enhance your treatment outcome and to do your best to prevent cancer from occurring in the first place.*

The Stem Cell Issue:

One of the current issues limiting the effectiveness of therapies that use chemotherapy, radiation, and surgery to treat cancer is referred to as the stem cell issue. In order to understand why certain treatments are more beneficial than others, and therefore be able to make educated choices about which treatment you or your loved ones receive, you need first to understand the stem cell issue.

It goes like this: Simply put, stem cells are the cells that are responsible for replacing and rebuilding various body tissues throughout our lifetime. They are located in our bodies in regions referred to as stem cell niches. In the stem cell niche, the stem cells remain in a type of hibernation (dormancy) until they are called into action in order to replace a particular tissue.

Before a stem cell can replace a given tissue, it must go through two stages of development referred to as proliferation and differentiation. During proliferation, biochemical cues cause the cells to reproduce, resulting in an expanded population of similar cells. Differentiation puts a stop to cell proliferation through the use of specific biochemical cues that cause the proliferating cells to differentiate into a specific type of cell.

Once a stem cell has differentiated, it has a finite life span and is limited in how many times it can reproduce (this life span is often referred to as a cell's Hayflick number).

The biochemical cues for proliferation and differentiation are based on genes specific to each tissue type. In general, genes that initiate proliferation are called oncogenes while genes that initiate differentiation are called tumor suppressors. Cancer, therefore, could be defined as an over-activation of oncogenes accompanied by the inhibition of tumor suppressors. It is the type and ratio of oncogenes to tumor suppressors that determines the aggressiveness of a person's cancer.

Standard chemotherapeutic agents used to treat most cancers inhibit rapidly dividing cells during treatment. This is good. We want to stop the development of cancer cells for sure.

There is a problem with this approach to treatment though, and it is the reason that cancers return and/or that standard treatments are unsuccessful for certain patients. The problem is that these standard chemotherapies do not get at the root of the problem: The dormant cancer-initiating stem cells.

To illustrate this point, consider a common side effect of cancer treatment: Hair loss. During chemotherapy, patients typically lose their hair (hair follicles are rapidly dividing cells, like cancer cells) but their hair typically grows back soon after treatment. This is good of course, but it is also proof that the dormant stem cells, located in the hair shafts, were not affected by the chemotherapy and it is likely then that the cancer stem cells weren't affected either.

Furthermore, stem cells activate certain genes that limit the effectiveness of chemotherapy. These genes, referred to as multi drug resistance genes (MDR), actively pump chemotherapeutic drugs out of the stem cells, leading to cancers that are resistant to standard treatment.

That is the stem cell issue and it must be considered when exploring the treatment that will be most effective for you.

How Do Cancer Cells Keep Growing?

Another key piece in the growth of cancers is a process called angiogenesis. Angiogenesis is the physiological process that tumors use in order to recruit new blood vessels in order to sustain their continual growth. They do this by over-expressing genes that initiate and direct the growth of new, leaky blood vessels from existing ones. Both angiogenesis and the spontaneous formation of new

blood vessels (vasculogenesis) are initiated by unique combinations of genes, indicating that angiogenesis is specific to tumor growth.

It is this presence of dormant cancer-initiating stem cells combined with the occurrence of angiogenesis in-between treatment regimes that leads to disease recurrence. So clearly, effective treatments must target stem cells directly or at the very least, inhibit their proliferation in a lasting way, not just during treatment.

To illustrate this point let's look at a few specific examples:

Ovarian Cancer Progression

It has recently been determined that the stem cells responsible for ovarian cancer reside in a stem cell niche located in the fallopian tubes. In fact, it has been determined that removal of both fallopian tubes and ovaries leads to a 50% reduction in mortality due to ovarian cancer. However, despite the significant increase in survival rates when this procedure is performed, a significant number of surgeries for ovarian cancer still only remove one ovary (and sometimes none) due to out-dated knowledge and reasons of surgical convenience. In order to avoid this outcome, patients must actually request the full procedure. Your awareness of the stem cell issue and of these options for treatment will mean a 50% increase in the likelihood of complete recovery. And that's just one treatment option! There are many options that, when combined, provide significant improvements to complete recovery rates. More on that in a bit.

Our knowledge of the Stem Cell Issue also allows us to effectively address issues such as metastasis.

Breast Cancer Progression

Many cancer types, including breast cancer, show a predictable metastasis to bone. Researchers have recently found that breast cancer stem cells interact with a type of cell derived from bone marrow, called mesenchymal stem cells in a process called epithelial-to-mesenchymal transition (EMT).

In the EMT process, breast cancer stem cells send out signals that attract the mesenchymal stem cells from the bone marrow into the tumor where these cells interact and stimulate the growth of breast cancer stem cells, as well as providing them with the ability to metastasize to bone.

EMT and mesenchymal-related gene expression are associated with aggressive breast cancers and result in a poor outcome for breast cancer patients due to bone metastasis. Furthermore, recent evidence shows that breast tumor cells enter into blood circulation and metastasize very early in breast cancer progression.

The importance of this knowledge is that it now provides us with an opportunity to attack breast cancer stem cells indirectly by blocking the EMT signals. You see, these same EMT signals that influence the development of cancer also play a role in inflammation. Drugs that block EMT signals have already been approved for the treatment of inflammatory diseases such as rheumatoid arthritis and if you know enough to ask for them, you can access them as part of your cancer treatment protocol.

Nutraceuticals: Mother Nature's Cancer Treatment

In addition to the exploration of enhanced treatment op-

tions such as fallopian tube removal and EMT blockers, another simple, inexpensive and immediately available treatment is available to all who want to enhance their chances for complete remission: Nutraceuticals.

There is substantial evidence that certain dietary compounds play a role in cancer prevention and treatment and there are nutraceuticals that specifically inhibit the genes involved in breast cancer stem cell proliferation, angiogenesis, EMT, and MDR.

Through the use of nutraceuticals, you can potentially prevent early metastatic processes such as EMT and angiogenesis before a tumor is large enough to be detected. Since nutraceuticals also inhibit MDRs, they can also be effective in treatment resistant breast cancers. In other words, nutraceuticals can be used to effectively target the various cancer driving processes at any stage of disease progression.

What's a Nutraceutical?

Nutraceuticals are defined as naturally occurring substances that have a proven role in regulating the genes and processes that drive cancers. In fact, many chemotherapeutic agents are derived from plants such as Vincristine from the periwinkle plant and Paclitaxel/Docetaxel from the bark of the Pacific Yew tree. These naturally occurring substances are then chemically altered so they can remain in the body for longer periods of time than their natural counter parts.

Standard nutraceuticals however, have not been chemically altered. They are just the natural form of certain plant phytochemicals that can be taken orally in certain synergistic combinations to enhance your body's natural ability to fight cancer at all stages of cancer development.

You can greatly improve your treatment and your chances of remission by incorporating some key nutraceuticals into your diet. While there are hundreds of beneficial nutraceuticals that aid in the prevention and treatment of many cancers, we will offer the following examples of nutraceuticals that have been shown to directly inhibit breast cancers regardless of Her, PR, or ER status.

To date, there have been numerous studies touting the anti-cancer effects of resveratrol (red wine, grapes) and EGCG (green tea) and both have been shown to inhibit proliferation, angiogenesis, EMT and metastasis.

However, clinical trials using these nutraceuticals as single agents have for the most part resulted in mixed results due to the fact that they only possess cancer-fighting activity at very high concentrations. In fact, it is almost impossible to achieve these cancer-fighting concentrations of resveratrol and EGCG through oral administration. This is known as the 'bioavailability issue', which has, until recently, been a significant hurdle preventing the incorporation of nutraceuticals into mainstream cancer treatment.

However, science has shown that these bioavailability issues can be greatly reduced through the use of synergistic combinations. In a recent study it was found that combining resveratrol and EGCG with quercetin, a derivative from red onions and apple peels, significantly lowered the doses required for each nutraceutical to be an effective cancer fighting agent.

It should also be noted that quercetin has many benefits of its own. Not only has quercetin been found to inhibit breast cancer angiogenesis, it also reactivates tumor suppressor genes such as those that are commonly inhibited in breast cancers. The synergistic benefits of quercetin are not confined to resveratrol and EGCG as it has also been shown to improve the effectiveness of certain chemotherapeutic agents used in the treatment of breast cancers.

Another example of quercetin benefitting cancer treatment can be seen in the co-administration of quercetin

with Doxorubicin (a first-line chemotherapeutic for breast cancer). Alone, Doxorubicin is associated with severe side effects to non-tumoral tissues due to its metabolites such as the cardio toxic Doxorubicinol. However, co-administration of quercetin with Doxorubicin not only increases the cancer fighting activity of Doxorubicin in highly invasive breast cancer cells, but also reduces the formation of the cardio toxic Doxorubicinol, greatly reducing heart damage: Increased healing benefit with lessened side-effects, from the simple addition of an easily accessible, inexpensive, natural supplement.

Additionally, the chemotherapeutic agent Tamoxifen (TAM) is a first line treatment for ER positive breast cancers in pre-menopausal women. However, breast cancer cells eventually acquire resistance to Tamoxifen. Co-administration of quercetin with Tamoxifen significantly reduces the occurrence of Tamoxifen resistance.

Furthermore, the actual bioavailability and cancer fighting activity of quercetin can be greatly enhanced by the addition of other common nutraceuticals. Kampferol, a nutraceutical found in basil and fennel, has been found to increases the bioavailability and cancer fighting activity of quercetin. Kampferol inhibits BCRP and reduces its ability to remove quercetin by 11.6 fold. So, just this one naturally occurring compound when added to certain others in the appropriate dose can have a powerful impact on all levels of cancer treatment and prevention. And there are many nutraceuticals that have similar powerful effects.

As you can see, the role of nutraceuticals in the prevention and treatment of cancers is significant and they should most certainly be a part of everyone's treatment protocol. By describing how these nutraceuticals work together in a synergistic manner, I am hoping to convince you to include a wide variety of foods in your diet that have established anti-cancer benefits and to explore the addition of certain nutraceutical combinations to your daily diet for the maximum prevention and most effective treatment of cancer.

There are so many options for scientifically based enhancements to standard treatment I highly encourage you to ensure that you explore all possible treatment options should you or anyone you know develop cancer.

If you would like to further explore the topic of nutraceuticals and enhanced treatment options please visit our web site @ www.ctoam.com where you will find more detailed articles on these topics as well as information on our personalized research services and individual nutraceutical diets.

Alex Rolland is a cancer researcher, educator, and CEO of Cancer treatment Options and Management (CTOAM). CTOAM is a personalized cancer research company that specializes in using the most current peer reviewed scientific research on cancer diagnostics, treatments, nutraceuticals, and clinical trials to educate patients on the treatments and diets that provide the best statistical chances for success.