THE SCIENCE BEHIND A CANCER FIGHTING DIET

HEALTH & WELLNESS:

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The Effective Use of *Green Tea* in Treatment & PREVENTION

In this article I'm going to bring you up to speed on the current scientific data regarding the benefits of green tea in cancer prevention and treatment so that you can feel confident in your knowledge of how to use green tea to prevent cancer and aid in cancer treatment.

First, a little science:

'Nutraceutical' is the term used to describe a naturally occurring substance that has a proven role in regulating the genes and processes that drive the progression of cancers.

My last article also discussed how you can use nutraceuticals to experience greater recovery rates, a reduction in cancer treatment side effects, and a reduced likelihood of recurrence for many forms of cancer with the aid of individual nutraceutical diets. This is a key area of interest and expertise for us at Cancer Treatment Options and Management (CTOAM.com).

We also discussed how the scientific community determines whether or not a specific nutraceutical truly has significant cancer fighting / suppressing power and more importantly, how this information can be misinterpreted and lead both to missed opportunities for treatment success and to the use of

substances and supplements that truly have no scientific value in the treatment of cancer. ***If you missed this article and would like to read it, here's the link:*** http://www.ctoam.com/category/educational-articles/cancer-fighting-diets/

How to Tell if a Substance Actually Helps in Cancer Treatment and Prevention:

In order for a nutraceutical to be used effectively, we must understand how it works in the body to target certain cancer mechanisms. This is referred to as the defined mechanism. While we can make an association that people using a certain nutraceutical may have a lower rate of certain cancers, this does not prove that the nutraceutical is involved.

In order for us to have confidence that a nutraceutical impacts a patient's cancer, we must have proof of what scientists call patient stratification, which means that:

a The nutraceutical works on a specific mechanism such as reducing a specific oncogene or increasing the activity of a specific tumor suppressor gene;

AND

b The specific oncogene/tumor suppressor gene is actually causing the specific form of cancer being addressed.

Understanding the Bioavailability of Green Tea:

Before we discuss how to use green tea to prevent and treat cancer we need to understand its ***bioavailability***. Bioavailability refers to how much of a particular substance the body actually gets to fully absorb and utilize for health benefits, once it has gone through the various processes of digestion in the body. This is a hugely important issue in maximizing the cancer fighting properties of any nutraceutical.

In order for a nutraceutical to have cancer-fighting power, it needs to reach the tumor at a level of concentration known to affect the specific type of cancer you are trying to treat. If the necessary concentrations are not reached, your body cannot make use of the EGCG in green tea to fight cancer. Therefore, it isn't enough to take a certain amount of green tea into your diet. You must ensure that you are ingesting it in the most beneficial way and with certain other substances which ensure significant absorption and keep the concentrations above necessary levels for maximum cancer fighting benefit.

Green tea/EGCG absorption takes places mostly in the small intestine, after which it then passes to the large intestine where it is broken down by the action of colonic microflora.

After being absorbed by the intestine, EGCG is transported to the liver where the cytosolic catechol-O-methyltransferase

Why Does Green Tea Benefit Cancer Treatment and Prevention?:

Camellia sinensis, or green tea contains bioactive compounds (nutraceuticals) referred to as catechins with the most prevalent being epigallocatechin-3-gallate, or EGCG.

EGCG has been shown in various studies to be associated with many health benefits including: prevention of cardiovascular diseases such as atherosclerosis and coronary heart disease; stroke; type II diabetes; reduced low-density lipoproteins and total cholesterol; reduced bone loss; reduced age related neurodegeneration; suppressing muscle oxidative stress and inflammation; hastening recovery of physical performance; increased fat metabolism; and a variety of other health related benefits such as protection against chemical exposure and radiation.

While those benefits are significant enough to warrant the use of green tea as part of your daily diet, there is also substantial evidence that EGCG and the other catechins found in ***green tea*** can affect and regulate many cancer related genes and molecular pathways, thus ***contributing directly to the outcome of cancer development and treatment.***

enzyme attaches a methyl group to it in order to target it for excretion and to decrease its solubility in water. Since the amount of this enzyme varies between people, so does natural EGCG bioavailability.

Once it is methylated, EGCG undergoes glucuronidation, and sulfation (attachment of more biomolecules), which are important for the effective elimination of the methylated product from the body.

The main point here is that without taking steps to enhance the bioavailability of green tea, these processes result in a minimal amount of EGCG actually reaching the blood stream in its pure form.

However, while EGCG may have the strongest cancer fighting activity of the catechins, the other catechins (EGC, ECG and EC) also have cancer fighting activity and even EGCG that has undergone methylation, glucuronidation, and sulfation has some cancer-fighting power. Additionally, a component of blood (human serum albumin), contributes to the transport and stabilization of EGCG by directly preventing further breakdown by oxidation.

At this point you may be wondering how you're going to make sure you are able to get enough Green tea / EGCG to where it needs to be in order to have maximum cancer prevention and treatment power. So, let's explore that now.

The Benefits of Green Tea / EGCG in Your Blood Stream:

When you drink green tea vs. ingest it in supplement form, you naturally bypass some of the digestive processes which will later dilute the amount of EGCG your body absorbs and utilizes. Drinking green tea allows you to absorb some of the EGCG through the tissues in your mouth and this EGCG goes directly into the bloodstream, avoiding the metabolic processes of the stomach, intestines and liver.

This is key to cancer treatment because one of the ways that cancer cells metastasize (spread through the body) is via the process of angiogenesis, which refers to the process that cancer cells use to recruit their own network of blood vessels for their increased growth needs. Therefore, by merely having an increased amount of EGCG and catechins in the blood, you go a long way to decreasing the ability of circulating cancer cells to attach to other parts of the body and metastasize.

Scientific Evidence that EGCG Aids in the Prevention and Treatment of Cancer.

Preclinical Studies:

A preclinical study is a study that is conducted in petri dishes or (unfortunately) on small animals in a lab setting.

While preclinical studies do not

provide us with enough evidence that the test supplement can indeed be used to prevent or treat a specific form of cancer, they do provide us with a rational explanation as to why the supplement might play a role in prevention or treatment based on its ability to regulate or interfere with a cancer causing mechanism. Preclinical evidence paves the way for human clinical trials.

Preclinical studies have indicated that green tea can play a role in preventing and treating various cancers including, colon, thyroid, oral, liver, lung, mesothelioma, esophageal, gastric, breast, prostate, nasopharyngeal, bladder, NSCLC, chronic lymphocytic leukemia, head and neck squamous cell carcinoma, pancreatic, endometrial adenocarcinoma, oral squamous cell carcinoma and osteosarcoma.

Population Based Association Studies:

The following association studies showed a reduced risk of various cancers in people that regularly drink green tea. While association does not prove that it was the green tea that resulted in the reduction of cancer, it does spotlight a significant connection which researchers then explore through the use of clinical trials (as below).

- Consumption of green tea was associated with a
- **62% reduced risk** of Multiple Myeloma (OR=0.38, 95% CI: 0.27-0.53).
- In women, regular green tea consumption was associated with **32% reduction** of pancreatic cancer risk (OR 0.68, 95% CI 0.48-0.96).
- Consumption of green tea was associated with a
- **19% reduced risk** of bladder cancer in people at risk for the disease (OR = 0.814, 95% CI 0.678-0.976).
- Consumption of green tea was associated with a
- **36% reduced risk** of esophageal cancer (OR = 0.64; 95% CI: 0.44, 0.95).

Interventional Clinical Trials:

These interventional clinical trials provide ***significant evidence that the EGCG and catechins found in green tea play a role in cancer treatment and prevention.***

1 In a recent phase II clinical trial on people with early stage chronic lymphocytic leukemia (CLL), daily oral EGCG (2000mg twice daily) in the Polyphenon E preparation resulted in the durable declines in measures of disease progression. In this study, 31% of patients had more than a ***20% reduction*** in their absolute lymphocyte counts (ALC) and ***69% of patients had a 50% or greater combined reduction in the size of their lymph nodes.***

2 Regulatory T cells (Tregs) are considered to be key immunomodulatory cells of the immune system and are increased in chronic lymphocytic leukemia (CLL). In this clinical trial on people with early stage CLL, ***80% of the patients had a reduction of lymphocytosis (high lymphocyte count) and absolute numbers of circulating Tregs and only 10% of the patients required chemotherapy directly after the trial.*** Furthermore, ***IL-10 and TGFB*** serum levels (cancer markers) declined throughout the green tea intake period, in both patients and controls. In this trial, ***green tea consumption resulted in the control of lymphocytosis as well as in the prevention of disease progression.***

3 Studies have indicated that ***30% of men*** with high-grade prostate intraepithelial neoplasia (HG-PIN) will develop prostate cancer within 1 year after repeated biopsy. In this study, men were given 200 mg of green tea catechins daily. ***After 1 year, only one tumor was diagnosed among the 30 green tea-treated men (incidence, approximately 3%), whereas 9 cancers were found among the 30 placebo-treated men (incidence, 30%).*** The total ***prostate-specific antigen (PSA)*** levels of the green tea-treated men showed values ***constantly lower*** with respect to placebo-treated ones. International Prostate Symptom Score and quality of life scores of GTCs-treated men with coexistent benign prostate hyperplasia improved, reaching statistical significance in the case of International Prostate Symptom Scores. No significant side-effects or adverse effects were documented. As a secondary observation, ***administration of green tea catechins also reduced lower urinary tract symptoms.***

4 In another study, men with positive prostate biopsies who were scheduled for radical prostatectomy were given daily doses of a supplement containing catechins and 800 mg of

EGCG up until the time of their radical prostatectomy, when blood samples were collected and tested for PSA levels and other markers of cancer progression. In this study, ***patients experienced a significant reduction in PSA serum levels.*** Furthermore, ***significant reduction in serum levels of HGF and VEGF (cancer markers) was found after brief treatment with the EGCG*** supplement.

How To Know What Kind of Green Tea to Use for Cancer Treatment and Prevention:

Before you run out to buy some green tea and start benefitting from its anti-cancer properties, there are some important considerations. Not all green teas are created equal!

One of the biggest hurdles of using EGCG for cancer treatment and prevention is that there are many different strains of green teas and they all do not contain the same amount of the cancer-fighting ingredient, EGCG.

It is important that you only spend your time and money ingesting a strain and brand of green tea that has been tested for its EGCG content and has proof that it is among the highest.

To take away the guess work for you I've added this diagram which shows you the EGCG content based on percentage of dried leaf weight of various green teas.

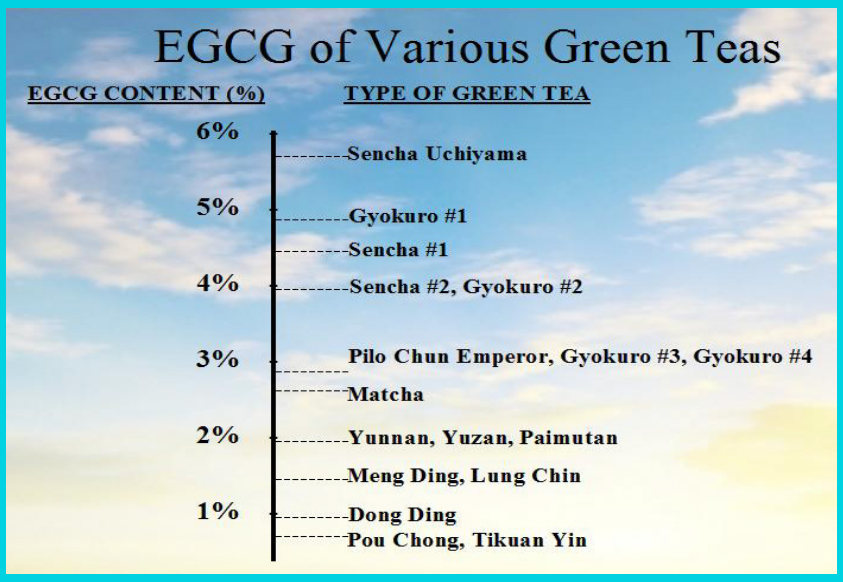

FIGURE 1: The amount of EGCG based on percentage of dry leaf weight found in various strains of green tea.

What I really want you to get from this diagram is that while a difference of 1 – 5% may not seem that significant at first glance, what it actually means is that ***drinking 6 cups of Sencha-Uchiyama steeped for 10 mins results in an equivalent amount of EGCG (~1.35mg) as drinking 69 cups of Pou Chong or Tikuan Yin green tea steeped for 2 mins!***

So, clearly the type of tea you're drinking has a powerful impact on the amount of cancer fighting benefits you'll experience. In other words, don't waste your time on anything but the Sencha Uchiyama or the Gyokuro teas.

How to Improve the Bioavailability of EGCG and Catechins in your Green Tea for Optimum Cancer Treatment and Prevention:

On top of the things we've already discussed, there are additional ways of improving the bioavailability of the EGCG and catechins in green tea.

Any or all of these suggestions will help to maximize the amount of cancer fighting nutraceutical making its way into your blood stream and preventing or attacking tumors.

At CTOAM we prepare ***specialized nutraceutical diet plans*** for clients that help them to ensure that the kinds of foods they are eating, and supplements they are ingesting, are being consumed in a way that absolutely produces maximum benefit for cancer treatment and prevention.

Our diet plans have led to ***significant reductions in cancer growth and tumor size as well as remission in a number of cases.*** Clearly a lot can be done with the right nutraceuticals.

If you would like more information on cancer prevention or on our personalized cancer fighting diet plans, or if you'd like to explore the most current treatment options available for your form of cancer please contact us at contact@ctoam.com or visit our site at www.ctoam.com and explore some of our articles on various diets and scientifically sound treatment methods that are producing results far greater than those of standard treatment approaches.

To Maximize the Bioavailability and Benefits of Green Tea in Your Diet for Cancer Treatment and Prevention:

- Avoid air and store your tea in a cool dark place.
- Take on an empty stomach at least 30mins before a meal.
- Hard water that contains calcium, magnesium and other metals can inhibit EGCG absorption so be mindful of the kind of water you use to make your green tea.
- Sucrolose, Xylitol enhance absorption in the digestive tract so perhaps mix a little with your green tea or take separately around the same time.
- 200mg Vitamin C increases bioavailability significantly by preventing EGCG degradation via oxidation. So try taking a Vitamin C tablet or pack close to the timing of your green tea ingestion.
- 1000mg of omega-3 (from salmon oil) increases bioavailability significantly so do your best to ensure you get some of these oils in your diet daily.
- Piperene, a component of black pepper also increases bioavailability. Taking a Piperene capsule with some green tea each day greatly increases the amount of EGCG making it to the places you need it to go for maximum cancer treatment and prevention.

I hope you have found this article informative and helpful and I welcome hearing from you with any questions you might have about green tea or about cancer treatment and prevention in general.

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