

Vitamin C Doubles Effectiveness of Chemotherapy and Radiation

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STORY AT-A-GLANCE

- › Vitamin C is selectively toxic to cancer cells, especially when administered intravenously (IV) or in liposomal form in high doses. Administering it with chemo and radiation also significantly improves the effectiveness of these treatments
- › Vitamin C in combination with nutritional ketosis and fasting prior to administering chemo radically improves the effectiveness of chemotherapy
- › For general health, an important but often overlooked aspect of nutritional ketosis is “feast and famine cycling.” The real magic happens during the refeeding phase, so one or two days a week, increase your carb and protein intake, and then cycle back into nutritional ketosis again

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Each day, more than 1,600 people prematurely die from cancer in the United States. Worldwide, an estimated 20,000 succumb to cancer on a daily basis. For a time, the war on cancer initially waged by Richard Nixon in the '60s, and the promise of targeted cancer drugs, gave hope.

Alas, they've all failed to live up to expectations, and have done nothing to improve cancer death rates. Globally, \$91 billion was spent on cancer treatments in 2013. In 2014, no cancer drug was approved costing less than \$100,000 for a course of treatment.

Yet, despite their exorbitant price tags, they offer little in terms of survival. Tarceva, for example, increases the median survival for pancreatic cancer patients by a mere 10 days. Meanwhile, there are inexpensive, non-patentable therapies available that could be truly game changing.

One such therapy is high-dose vitamin C. Another is nutritional ketosis – and oncologists in Turkey have presented evidence showing the combination of these two strategies have the ability to "turbo charge" conventional chemo protocols, making them incredibly effective, and far safer to boot.

Vitamin C Improves Effectiveness of Chemo and Radiation

Research has shown vitamin C is selectively cytotoxic to cancer cells when administered intravenously (IV) or in liposomal form in high doses. The mechanism behind vitamin C's ability to selectively target cancer cells has to do with the generation of hydrogen peroxide, which is ultimately what kills the cancer cells.¹

Normal tissues remain unharmed by the high levels of hydrogen peroxide generated because healthy cells have several ways to remove it, thereby preventing buildup to toxic levels.²

One of the primary pathways of removal is the enzyme catalase, and cells with reduced catalase activity – such as cancer cells – are more prone to die from excess reactive oxygen species and secondary free radicals when exposed to high amounts of vitamin C.^{3,4,5}

Research⁶ also shows high-dose vitamin C administration in combination with chemotherapy and radiation significantly improves the effectiveness of these treatments. Cancer cells have unstable iron particles (also known as redox active iron molecules), which makes them more vulnerable to oxidative damage caused by high-dose vitamin C.

When redox active iron reacts with vitamin C, hydrogen peroxide and associated free radicals are generated, which damage the cancer cells' DNA and weaken them, thereby

making them more vulnerable to the effects of chemo and radiation. As noted by one of the study's co-authors, Garry Buettner, Ph.D.:⁷

"This paper reveals a metabolic frailty in cancer cells that is based on their own production of oxidizing agents that allows us to utilize existing redox active compounds, like vitamin C, to sensitize cancer cells to radiation [therapy] and chemotherapy."

Vitamin C Doubles Survival Rate of Brain Cancer Patients Treated With Radiation

To evaluate the safety of vitamin C, 11 patients with glioblastoma (a highly malignant and aggressive type of brain cancer) received high-dose vitamin C IV treatments three times a week for two months while undergoing radiation therapy, followed by two weekly infusions for another seven months. As reported by Time Magazine:⁸

"[S]o far, half of the people in the study were alive nearly two years later. The average survival for the disease is generally around a year.

In a separate study designed to get an early sense of the vitamin's effectiveness, the researchers also tested the high-dose vitamin C in a group of 14 people with non-small cell lung cancer.

So far, 93 percent of the people receiving the vitamin C infusions are responding to chemotherapy and radiation, compared to 40 percent who usually do.

In an encouraging finding, more than 30 percent of the people getting the vitamin C also showed signs of their tumors shrinking. Usually, only 15 percent to 19 percent of people receiving chemo and radiation see their tumors get smaller."

In the second phase of the trial, the researchers will investigate vitamin C's effects on patients with stage 4 lung cancer and other aggressive cancers.

Other Ways Vitamin C Benefits Cancer Patients

Aside from the mechanisms already mentioned, vitamin C also benefits cancer by lowering inflammation.^{9,10}

As a general rule, chronic inflammation is a hallmark of cancer, and research shows IV vitamin C treatment lowers pro-inflammatory cytokines and C-reactive protein, and that these improvements correlate with a reduction in tumor size.

It also lowers the risk of metastasis. A study done by scientists at the Riordan Clinic (the successor to Linus Pauling and his work on vitamin C) noted a positive response in 75% of patients.

Other research^{11,12} done by scientists at the Lewis Cantley of Weill Cornell Medicine in New York found high doses of vitamin C help kill and eliminate colorectal cancer cells with certain genetic mutations. Other studies¹³ have shown high-dose vitamin C can help slow the growth of prostate, pancreatic, liver and colon cancer cells.

Human studies also show IV vitamin C can help improve symptoms associated with cancer and cancer treatment, such as fatigue, nausea, vomiting, pain, loss of appetite and overall quality of life.

While the above studies and most protocols use IV vitamin C, there is compelling research and anecdotal clinical evidence to support the use of liposomal vitamin C. It may be nearly as effective, or even more effective, than IV vitamin C.

It certainly is far easier and less expensive to administer. I personally think liposomal C should be in everyone's medicine cabinet and travel kit, as high doses (such as 2 to 5 grams every hour) can obliterate most infections.

Vitamin C and Nutritional Ketosis Is a Winning Combination

While the featured research is certainly on the right track, an oncology center in Turkey has taken it a step further, showing that vitamin C in combination with nutritional ketosis

improves the effectiveness of chemotherapy to such a degree that a minimal dose can be used to treat even the most aggressive and advanced cancers.

I interviewed Dr. Abdul Kadir Slocum from the ChemoThermia Oncology Center in Turkey about this research. If you missed it, you'd be well advised to watch it now, because this metabolically supported therapy is truly groundbreaking, offering hope where previously there was none.

In summary, metabolically supported chemotherapy involves applying chemotherapy with a variety of interventions to support its effectiveness. This includes the use of high-dose vitamin C, a ketogenic diet, hyperthermia, glycolytic inhibitors and hyperbaric oxygen therapy, just to name a few.

All oncology patients at the center are put on a ketogenic diet, which creates metabolic stress on the cancer cells.

Then, prior to administering the chemo, the patient will do a minimum 14-hour fast (Slocum recommends fasting as long as possible, but a minimum of 14 hours is required), which further increases the metabolic stress on the cancer cells.

At this point, the patients will typically have a blood glucose level around 80 milligrams per deciliter (mg/dL). They then apply glycolytic inhibitors to inhibit the glycolysis pathway in the cancer cells, which creates a terrific amount of metabolic stress, as the cancer cells are already starved of glucose.

Insulin is then applied to lower the blood glucose levels to around 50 or 60 mg/dL, inducing mild hypoglycemia. At that point, when the cancer cells are maximally stressed and weakened, the chemotherapy drug is applied. An added boon of this metabolic approach is that a far lower dose of chemotherapy can be effectively used, thereby lowering the risk of side effects.

In the days following chemotherapy, hyperthermia and hyperbaric oxygen therapy is applied, plus a daily infusion of glycolytic inhibitor therapies with high-dose vitamin C (50 grams) and dimethyl sulfoxide (DMSO).

Metabolically Supported Chemotherapy Successfully Treats Aggressive Cancers

Two years ago, Slocum's oncology team published its first paper,¹⁴ reporting complete response for stage 3 rectal cancer. The standard of care for rectal cancer and the only curative option has been surgery or chemo-radiotherapy followed by surgery. In this case, they used metabolically supported chemotherapy, radiotherapy and hyperthermia. No surgery was necessary.

Their second paper,¹⁵ published in January 2016, was a case series of 33 patients with stage 3 and 4 pancreatic cancer – one of the most aggressive and deadly cancers known. Eighty-one percent of these patients had stage 4 disease when the treatment began, and many of them also had large scale liver metastasis. The typical life expectancy of someone with stage 4 pancreatic cancer is six to 10 months. Most die within weeks or months once they have large-scale liver metastasis.

The center treated them with a standard conventional protocol using chemotherapy applied in a metabolically supported fashion (which included the ketogenic diet, fasting prior to chemo administration, high-dose vitamin C, plus hyperthermia, hyperbaric oxygen therapy, supplements and glycolysis inhibitors).

The expected median survival time for the conventional chemotherapy protocol alone is between six and 11 months, depending on the drug used. But when given in combination with these other metabolic supports, the median survival time shot up to 20 months, and over 50% of the patients are still alive today!

Nutritional Ketosis Appears To Be a Key Component of Successful Cancer Treatment

Maintaining nutritional ketosis and fasting for a minimum of 14 hours before the chemotherapy treatment appears to be key for the overwhelming success rate achieved by ChemoThermia Oncology Center. A number of other researchers have verified the remarkable ability of a [ketogenic diet](#) to prevent and suppress cancer, and when you

combine that with fasting and high-dose vitamin C, you end up creating a very hostile environment for cancer cells.

My book, "[Fat for Fuel](#)" – which has been peer-reviewed by over two dozen medical and scientific experts – details how to implement nutritional ketosis for optimal health and disease prevention. Besides the information presented in "[Fat for Fuel](#)," you'll also find many collaborative supports, including a nine-hour-long free video series that we hope to launch in early May.

Credentialed nutrition professional Miriam Kalamian is also developing a certification course to go along with it through the American College of Nutrition.

This certification will teach any qualified clinician – primarily certified clinical nutritionists but also physicians – how to practically implement nutritional ketosis. Eventually, I expect there will be a virtual army of clinicians available to assist patients with this kind of protocol. Hopefully, at that point we'll finally start making a dent in cancer statistics.

An important but often overlooked aspect of nutritional ketosis is "feast and famine cycling." Meaning, you don't actually want to stay in ketosis indefinitely. The real magic actually happens during the refeeding phase, so one or two days a week, you'll want to increase your carb and protein intake, and then cycle back into nutritional ketosis again.

ChemoThermia Oncology Center uses this kind of cycling as well, although under far stricter conditions. When you're dealing with late-stage cancer, you cannot break your ketosis that frequently. However, on the days patients receive chemotherapy, which is once every two or three weeks, they're allowed to eat as many carbohydrates as they want.

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