Integrative Oncology for Clinicians and Cancer Patients

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Abstract

Worldwide medical literature supports the notion that environmental and nutritional factors play a role in the development of cancer. Nutritional recommendations to the public to help prevent cancer are available from the USA's National Cancer Institute, the American Cancer Society and other organizations. However, when it comes to treating patients who have been diagnosed with cancer, the vast majority of oncologists fail to deal with nutritional and life-style factors to help their patients manage their cancers. Evidence continues to mount that some of the same recommendations designed to prevent cancer should also be applied to patients who already have cancer. Implementing such a program of lifestyle modifications, improvement in diet, exercise, stress management, optimal exposure to sunlight, improving energy flow and nutritional supplements should improve cancer patients' survival statistics and the quality of life of these patients, including significantly reducing the side effects of conventional treatments.

This article focuses on dietary changes and nutritional supplements to help clinicians educate cancer patients, so that they may better deal with their illness. Highlighted are: principles involving an optimal diet, avoidance of harmful chemicals and use of nutritional supplements. Some of the controversies surrounding nutritional supplements are reviewed. Specific topics covered include: a broad range supplement program, vitamin C, amygdalin, iodine, fermented wheat germ extract, mushroom extracts, supplements developed by the late Mirko Beljanski PhD and the antineoplastons of Stanislaw Burzynski.

Finally, there is a discussion about paradigms in health care and the effects of politics and economics on how health care is practiced today.

Key words : Integrative Oncology, Integrative Cancer Treatment, Nutritional Supplements for Cancer, Nutrition for Cancer Patients, Complementary Cancer Treatment

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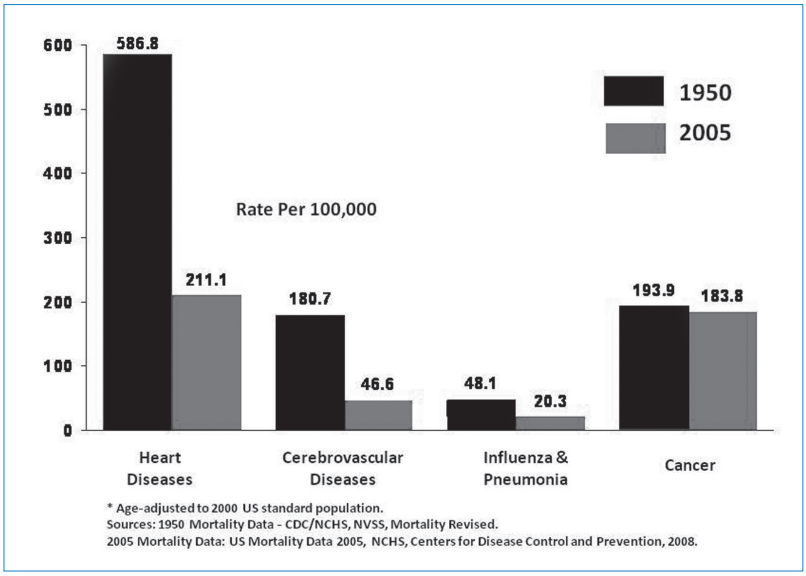


Figure 1　Change in the U.S. Death Rates 1950 & 2005

1. Conventional Cancer Treatment Alone is Not Working

According to the Center for Disease Control in the USA, the age-adjusted mortality rate in the USA for cardiovascular disease and cerebrovascular diseases dropped dramatically between 1950 and 2005 while that for cancer dropped only slightly (See Figure 1). This implies that the treatment methods for cancer have not been very effective during this time. Worldwide, conventional cancer treatment methods include: surgery, radiation, chemotherapy, hormonal manipulation for certain cancers and the newer monoclonal antibody targeted therapies. The goal of cancer treatment appears to be to destroy cancer cells at all costs without much attention being paid to the health of the host, the patient. There is little emphasis on helping patients make lifestyle changes or to improve their nutrition. Regarding nutritional supplements, oncologists often tell patients to avoid them, as they might interfere with conventional treatment, since radiation and chemotherapy are largely pro-oxidant treatments and many nutritional supplements have antioxidant properties. Oncologists often tell patients that it doesn't matter what you eat, as long as you consume enough calories to keep your weight up while you are undergoing conventional treatments that often cause a loss of appetite.

However, the adjusted mortality rates in Figure 1 show that this approach is not really working very well. The purpose of this paper is to give a different perspective for treating cancer patients. Rather than just focusing on killing cancer cells, the treating physician should be able to considerably improve survival and the quality of life of cancer patients by taking a much broader view of the healing process. By utilizing a more integrative approach to cancer patients, therapeutic results should be improved, including a better quality of life, prevention of cancer recurrences and a longer survival time for advanced cases. I'll discuss various integrative approaches in subsequent sections of this paper.

2. Evidence for the Role of Diet in Helping to Prevent Cancer

A number of studies suggest that dietary factors can either prevent or encourage the development of cancer. In his book, *The China Study*,[1] T. Colin

Campbell, PhD, outlines the findings of the most comprehensive study of nutrition ever conducted. Dr. Dean Ornish says of Dr Campbell that, "Everyone in the field of nutrition science stands on the shoulders of Dr. Campbell, who is one of the giants in the field." With numerous references,[2-5] Dr. Campbell asserts that a whole food, plant-based diet helps to prevent and treat cancer and other degenerative conditions. The elimination or marked reduction in animal-based foods will drastically cut cancer rates and improve results of cancer treatment. The elimination of refined plant-based foods containing sugar, white flour and various additives is also important. He further presents evidence that an optimal diet drastically reduces the negative effects of carcinogens and inhibits cancer promotion. In this book, Campbell is critical of the notion of "reductionism" research in nutrition (e.g. focus on fats or proteins or carbohydrates), rather than looking at the effects of a whole foods, plant-based diet. He claims that with reductionism research, you don't see the forest through the trees. He is also critical of the fact that health care education to the public and to professionals is largely controlled by dairy, meat and processed food and drug companies. A diet that is based largely on whole plant-based food with a variety of colors is healthful and protective against cancer. Various organizations, such as the American Institute for Cancer Research, the American Cancer Society and the National Cancer Institute, support the notion that cancer is largely preventable with an optimal, largely plant-based diet.

Expanding on the idea of a whole food, plant based diet, Gabriel Cousens MD, in his book *There is a Cure for Diabetes*[6], suggests that when such a diet is mostly raw, the therapeutic benefits for preventing and reversing degenerative diseases, such as cancer, are enhanced. He points out that the therapeutic benefits of phytonutrients that are not damaged by heat are considerable because they may combine with transcription factors in the cell to upregulate anti-cancer, anti-inflammatory and anti-diabetic genes, while downregulating transcription factors that have the opposite effect. Phytonutrients can function as a master switch to turn many genes on or off. The tiny amounts of phytonutrients in food can have a large effect on phenotypic gene expression.

A highly refined processed food diet that emphasizes animal based foods has the opposite effect. There is no question that anyone adopting a healthy whole food, plant-based diet will drastically reduce his or her risk of developing cancer. We see that the Japanese people, when following a traditional Japanese diet, have a relatively low incidence of some of the most common cancers such as breast, prostate and colon cancer. However, when they migrate to the United States and adopt the standard American diet, the incidence of these cancers goes up dramatically.

Another excellent book written by nutritionally oriented oncologist and radiotherapist Charles B Simone MD, titled *Cancer & Nutrition*[7], outlines an extensive program to help prevent cancer. This program involves a largely whole foods, plant-based diet, exercise program, dietary supplements and tips for stress management. It contains hundreds of references to the scientific literature, that support his program.

Not everyone agrees that a completely plant-based diet is best for everyone. Famed dentist and researcher Weston A Price spent many years in the 1930's researching the relationship between diet and the development of degenerative disease by interviewing and examining people in many cultures throughout the world. He noted the health of the people, including careful examinations of their teeth and mouths while they ate their traditional diets and then again after western, so-called civilized diets of refined processed foods were introduced. His observations were striking. People who ate a wide variety of whole food diets, both animal and plant based, were extremely healthy but, once refined foods were introduced, health deteriorated and all kinds of chronic degenerative diseases including cancer evolved.[8] Like T. Colin Campbell and Gabriel Cousens, the Price-Pottenger Foundation advocates eating whole foods

and avoiding processed food. However, they do advocate the use of certain types of animal foods. They advocate the use of raw dairy products and beef from grass fed animals. They emphasize using organic foods and foods that do not contain chemicals. See: http://www.ppnf.org/catalog/ppnf/ for more information about this approach.

Another extremely valuable book entitled *Beating Cancer with Nutrition*[9] by nutritionist Patrick Quillin PhD, RD, CNS, offers very practical information to prevent cancer with nutrition, including nutritional supplements. Quillin is also not an advocate of extreme vegan diets. This book should be read and its ideas implemented by any physician who is treating cancer patients.

3. Nutritional Recommendations and Other Suggestions for Patients Diagnosed with Cancer

Although many physicians would acknowledge that nutritional factors are important in preventing cancer, when it comes to treating patients who have been diagnosed with cancer, the vast majority of oncologists fail to discuss nutritional and lifestyle factors to help their patients manage their cancers. Oncologists attempt to rid the body of cancer cells with surgery, radiation, chemotherapy, anti-hormonal therapies and/or the new monoclonal medications. Little attention is paid to lifestyle factors, nutritional recommendations or nutritional supplements. Oncologists often give patients dietary advice that is exactly opposite to the advice contained in cancer-preventive diets. Patients are frequently told to eat high calorie, high fat, high protein diets that also contain lots of sugar and other refined processed foods. They are sometimes told that it doesn't matter what you eat as long as you eat enough calories to sustain your weight during your conventional treatment.

There is considerable direct and indirect evidence that some of the same recommendations designed to prevent cancer should also be applied to patients who already have cancer. Implementing such a program should improve cancer patient survival statistics and the quality of life of these patients, including significantly reducing the side effects of conventional treatments. Both Dr. Simone and Patrick Quillin in their books cited previously have chapters showing the benefits of excellent nutrition for patients undergoing conventional cancer treatment with references to support their recommendations.

Common sense tells us that a patient's clinical outcome will be related to his nutritional intake. Food supplies the building blocks for all cellular structures in the body (cell membranes, DNA, proteins, etc…). It supplies the calories or fuel that, when combined with oxygen in the body, supplies energy for all biochemical reactions. Finally, food supplies information to the genes of the body to help regulate all biological processes. This epigenetic information can help the genes to repair and heal the body or cause a deterioration of the healing process, depending upon what information from food is supplied.

One important area of concern for cancer patients and people in general has to do with exposure to toxins and how well the body is able to rid itself of these toxins. Toxins may be carcinogenic or toxic in other ways. We are what we eat, drink, breathe, touch, absorb and can't eliminate. We have many systems in our body to help protect us from toxins and to help our body eliminate them. First, we have the barrier function of our skin and our mucus membranes. We eliminate many toxins through bowel movements and it is important for all us to move our bowels at least once daily. One of the main functions of the liver is to eliminate toxins. This is generally done in two steps, with toxic organic molecules being converted to a more water-soluble form in phase one and conjugated to another organic molecule in phase two for easier elimination either through urine or feces via the bile. Many phytonutrients in fruits, vegetables and herbs are capable of influencing various detoxification pathways to help the body eliminate toxins. For example, sulforaphane derived from broccoli sprouts, upregulates

phase 2 of liver detoxification and shows many anti-cancer properties.[10, 11)]

It is difficult to find controlled studies comparing a group of cancer patients receiving only conventional treatment with another group that receives conventional treatment along with a dietary program that includes many of the principles of nutrition that I discuss in this article. One such study recorded the survival time from diagnosis of pancreatic cancer patients who ingested a macrobiotic diet, which consists primarily of whole, plant based foods. In the first major scientific study of the macrobiotic approach to cancer, researchers at Tulane University reported that the 1-year survival rate among patients with pancreatic cancer was significantly higher among those who modified their diet than among those who did not (17 months versus 6 months). The one-year survival rate was 54.2 percent in the macrobiotic patients versus 10.0 percent in the controls. All comparisons were statistically significant.[12)]

Also, reported in this paper was a study in which prostate cancer patients were prescribed a macrobiotic diet. For patients with metastatic prostate cancer, a case control study demonstrated that those who ate macrobiotically lived longer (177 months compared to 91 months) and enjoyed an improved quality of life. The researchers concluded that the macrobiotic approach may be an effective adjunctive treatment to conventional treatment or in primary management of cancers with a nutritional association. "This exploratory analysis suggests that a strict macrobiotic diet is more likely to be effective in the long-term management of cancer than are diets that provide a variety of other foods," the study concluded.

In spite of the limited number of published studies on this subject, many nutritionally oriented clinicians are convinced that an optimal nutritional program is essential for improving the results of cancer treatment and that such a program should be recommended for cancer patients and not reserved only for those without cancer who are looking to prevent it. It should also be used by patients who have undergone successful conventional treatment and are searching for ways to help prevent a recurrence.

Here is a list of recommendations that I give to my cancer patients concerning dietary recommendations. I suggest they avoid: sugar and white flour products; alcohol, caffeine, fluoridated and chlorinated water, foods containing bromine, hydrogenated fats and all trans fatty acids, artificial chemicals added to foods (such as artificial sweeteners like aspartame and sucralose (Splenda), artificial colors and flavors, preservatives); fish contaminated with mercury; and genetically modified food. Many people are sensitive to gluten (protein found in wheat, rye and barley) and those people should avoid these foods. Other food allergens should also be avoided.

Non-dietary items to be avoided include: tobacco, recreational drugs like marihuana and cocaine, mercury amalgam dental fillings; exposures to toxic chemicals; synthetic hair dyes; aluminum containing antiperspirants; harmful electromagnetic frequencies (such as cell phones as much as possible, microwave ovens); exposure to nuclear plants; and tight fitting clothing such as wired bras, which cut off lymphatic circulation from the breasts. A more complete list of items to avoid can be found at my website: www.schachtercenter.com (Click on literature and articles and look for Avoid list).

My suggestions as to what people should eat include some of the points that have been made previously. I suggest that patients eat primarily whole foods, mostly plant-based, largely raw and preferably organic. I tell them to shop in the outer isles of the super market where most whole foods are kept and to avoid the inner isles, which largely have packaged processed foods. A wide variety of vegetables, fruits, nuts and seeds and legumes should be eaten and attempts should be made for the foods in the diet to be of many colors (a rainbow array), as this helps to ensure that a wide variety of phytonutrients are obtained in the diet. Fresh, raw, vegetable juices with a smaller amount of fruit are excellent. Animal foods, though somewhat limited, should generally be unprocessed,

without chemical additives. Meat should be from grass fed animals and organic when possible. Dairy should be certified raw if it is available. Eggs should be from free range chickens and organic when possible. For most people, I do not recommend total elimination of animal products, as advocated by Dr. Campbell and Dr. Cousens. Food should not be overcooked or burned.

Additional suggestions I give to my patients include: (1) Eat slowly and chew your food well to improve digestion and prevent gastric upset; (2) Don't skip breakfast because studies have shown that people who eat breakfast generally have a lower intake of total calories for the day and have a better insulin sensitivity; (3) Meals should not be skipped as doing so causes an increase in insulin resistance; (4) Cooking method matters, as harsh cooking methods produces carcinogenic heterocyclic amines, oxidized cholesterol, lipid peroxides and advanced glycation end products (AGES), all of which are carcinogenic; (5) It is best to boil, poach or stew foods and avoid frying, broiling and roasting; and (6) Avoid the microwave, which tends to destroy nutrients and change blood chemistries.[13)]

If physicians caring for cancer patients helped them to improve their diets, several positive effects could be expected. These include: (1) Avoidance of malnutrition (many patients die from malnutrition, rather than the cancer process itself); (2) Minimization of adverse effects from conventional treatment; (3) Optimization of cytotoxic effects on cancer cells; (4) Protection of healthy tissue; (5) Healthy cell proliferation; (6) Immune enhancement, helping to protect the patient against infections; (6) Beneficial hormone changes.

4. The Role of Hope, Attitude and Stress Management; Breathing and Energy Flow; Exercise, Sunlight and Vitamin D; Importance of Sleep and the Need for Healthy Social Relationships

(1) The Role of Hope, Attitude and Stress Management for Cancer

Although this paper will not stress other aspects of lifestyle that are important for cancer patients, these need to be addressed. First and foremost, a patient needs to be given hope that the disease can be overcome or at least controlled. Unfortunately, under the guise of not giving patients false hope, oncologists frequently predict how long a patient will live. So, a patient may be told: "you have 6 months to live." Many people are extremely suggestible and when given this dictum, they somehow fulfill the prophecy. It is absolutely reasonable for a physician to tell a patient that he doesn't know how long the patient will live. The physician should emphasize that each person is an individual and that there is no way of telling how he will respond to many of the non-conventional treatments that are being implemented. The attitude of the patient is important in this equation and helping the patient believe that he can respond to treatment will be important for his prognosis. One can give a general prognosis for those with a similar situation who have received similar conventional treatments, but emphasize that this patient's response, especially with some of the integrative treatments, might be much better. Numerous books have been written about psychological aspects of dealing with cancer. Bernie Siegel's book *Love, Medicine and Miracles: Lessons Learned about Self-Healing from a Surgeon's Experience with Exceptional Patients*, written many years ago, is still quite applicable.[14)] Lawrence LeShan's book *Cancer as a Turning Point: A Handbook for People with Cancer, Their Families, and Health Professionals* is also worthwhile.[15)] Other inspirational books by people who have overcome cancer using various nutritional and other lifestyle changes are highly recommended.[16, 17)]

(2) Learning to Breathe Deeply and Energy Flow

The importance of learning how to breathe deeply (deep abdominal yoga-type breaths) and improving oxygenation is key to cancer patients and it should be emphasized that cancer cells generally are anaerobic and don't like oxygen. So, improving oxygenation should help the patient's own defenses overcome inflammation and slow down the cancer process. Improving energy flow is compatible with this notion and helping patients learn yoga, tai chi, Qi Gong or other energy disciplines are almost always helpful. Acupuncture, acupressure and massage can also be quite useful

(3) Exercise

Patients should be encouraged to move and to exercise as tolerated. They must learn to listen to their bodies. If a person vigorously exercises and is out of commission for the next few days, he has done too much. But it is extremely important to begin to exercise, walking outside or on a treadmill or riding a stationary bike. This tones up the body, improves circulation and improves the defenses of the body. Stretching and limited strength training are also helpful.

(4) Sunlight and Vitamin D

Another important factor that has been totally underestimated as important for healing is exposure to sunlight. John Ott introduced the concept in the 1970's, but like many other important insights, it has been ignored largely because of lack of financial incentives. In his book, *Health and Light*, Ott describes a study involving cancer patients at New York University, in which very ill cancer patients were exposed to sunlight a few hours a day. This resulted in a marked improvement in their prognoses.[18] Jacob Liberman OD, PhD wrote a book in 1990 emphasizing the role of light in health and predicting its importance in the future, but the concept has not trickled down to conventional oncology.[19]

The importance of light has become somewhat more fashionable lately with the recent tremendous emphasis on the role of vitamin D in health and disease. Michael Holick has helped to fuel interest with his book *The UV Advantage*.[20] In this book, he attempts to counter the nonsense promulgated by the dermatology industry that the sun is bad for you and you should avoid it at all costs; when exposed to it, you must cover yourself with sunscreen to avoid the damage. This advice, according to dermatologists, prevents damage to the skin and prevents skin cancer. But, Holick points out that the risk of the most dangerous skin cancer, malignant melanoma, is increased with severely restricted sun exposure and vitamin D deficiency. The best way to get vitamin D is to have some exposure to the sun on bare skin not covered with sun screen. It is important to avoid burning the skin, but some limited exposure to sun is generally good for you. According to Ott, it is not just vitamin D, but other aspects of exposure to full spectrum sunlight that is therapeutic. I recommend that my patients try to expose themselves to some sunlight as much as possible without allowing sunburn to occur.

(5) Quality Sleep

Another important factor that must be addressed relates to sleep. Good quality sleep is essential for any type of healing program. Unfortunately, conventional medicine usually addresses sleep problems with prescription drugs like benzodiazepines (Clonazepam, Valium, Dalmane and others), SSRI's (e.g. Paxil), atypical antipsychotic agents (e.g. Seroquel or Zyprexa) or various sleep medications (e.g. Ambien). These usually wind up making the patient dependent upon the medication, but do not really offer sustained deep sleep that encourages the repair process of the body. Frequently, as a result of stress of all sorts, the patient has a hyperactive hypothalamo-pituitary-adrenal axis and elevated cortisol levels and/or epinephrine surges contribute to problems falling asleep or staying asleep. Often conventional medications prescribed for various conditions and exposures to chemicals contribute to the dysregulation of the hypothalamus and other areas of the brain associated with sleep. The process of detoxification, removing exposure to toxic substances, stress management techniques (such as

deep breathing), regular exercise, the tapering of various psychotropic medications and the supply of herbs and nutrients (like amino acid precursors to serotonin, herbs that enhance the GABA receptors) and other strategies discussed in this paper can be extremely beneficial in helping a patient to regain healthy sleep patterns. An excellent recent book by James Harper *How to Get Off Psychiatric Drugs Safely*[21] and the website: www.theroadback.org are excellent resources to help patients taper off psychiatric drugs safely. Sleep must be addressed very early in any treatment program and the treatment must be tailored to the patient.

(6) Improving Relationships

Finally, it is important for cancer patients to enjoy healthy relationships. A person's prognosis is affected by the quality of relationships and his desire to live. Frequently, brief or intermittent psychotherapy with an active psychotherapist that works on the person's strengths, rather than dwelling on weaknesses or problems can do wonders. Proper group and/or family support can be key. A practitioner needs to evaluate the social support system of the patient and attempt to build on positive relationships. An active support group may be helpful in this situation. However, many cancer support groups are in hospitals and are dominated by pure conventional oncology concepts, including ridiculing or criticizing any integrative cancer approaches. It is important for cancer patients to avoid such groups and to find groups that will generally support what they are doing.

5. Use of Nutritional Supplements for Cancer Patients

(1) Comparing and Contrasting Nutritional Supplements with Chemotherapeutic Cancer Agents

One of the most controversial areas surrounding the care of cancer patient relates to whether or not they should receive nutritional supplements while undergoing radiation and/or chemotherapy. Many oncologists advise cancer patients not to take any nutritional supplements because they contain anti-oxidants and since radiation and chemotherapy are pro-oxidant, the nutritional supplements will interfere with the activity of these pro-oxidant treatments. So, the important question is whether taking nutritional supplements while undergoing these treatments will help the help the treatment results, interfere with treatment results or have no effect on the treatment. Also, might the answer to this question be affected by the nature of the conventional treatment, the kind and dosage of the supplements, the genetics and other factors within the patient and other environmental factors, such as the patient's diet?

Before trying to answer the question as to the value of nutritional supplements while undergoing conventional cancer treatment, it might be helpful to discuss the similarities and differences between conventional treatment and nutritional supplements. An ideal chemotherapeutic agent would be one that is highly selective in its action by promoting the destruction of cancer cells while not harming or even nurturing normal cells. Unfortunately, conventional therapy does not do this. Radiation, chemotherapy, anti-hormonal treatments and even the targeted monoclonal antibody treatments generally are harmful to normal cells; hence the adverse side effects observed during their administration.

(2) How Nutritional Supplements May Affect Cancer Processes-John Boik's Work

Nutritional supplements, on the other hand, may be harmful overall to cancer cells while nurturing normal cells. In other words, nutritional supplements generally have different effects on cancer cells than they have on normal cells. In his excellent, extremely well documented book, *Natural Compounds in Cancer Therapy: Promising Nontoxic Antitumor Agents from Plants & Other Natural Sources*,[22] John Boik outlines a series of procancer events that occur during the development of cancer and shows how natural substances can interfere with these processes without harming normal cells. These events are:

(1)-Gene mutations and genetic instability; (2) Gene expression (Switching on and off); (3) Abnormal signal transduction; (4) Abnormal cell to cell communication; (5) New blood vessel formation-angiogenesis; (6) Invasion into tissues; (7) Metastasis to other organs; and (8) Immune suppression and other forms of immune evasion.

With multiple references, Boik explains how various natural substances that can be found in nutritional supplements can affect these processes. Many of these substances can affect several steps of the process. For example, Curcumin (derived from turmeric) inhibits PTK, PKC, NFkB and PGE2 synthesis (all of which play a role in inflammation and cancer); inhibits invasive enzymes and stimulates or supports the immune system. EPA (from fish oil) inhibits PKC and PGE2 synthesis, stimulates or supports the immune system and inhibits invasive enzymes. Vitamin D3 (1.25 Dihydroxy D) is involved with 9 possible anti-cancer effects, melatonin with 15, vitamin A with 13 and Boswellic acid with 15.

Boik suggests that natural compounds are mild relatives to chemotherapy drugs, being about 30 times less potent in vitro, but about 21 times less toxic than most chemotherapy drugs. Each substance acts at several steps of the cancer process. They act synergistically and are used most effectively in combination. Boik's book contains hundreds of pages reviewing the studies showing these relationships and is a very valuable resource for any clinician adding nutritional supplements to his cancer patient regimes.

(3) Patrick Quillin's Work with Nutrition and Nutritional Supplements for Cancer Patients

Another book that summarizes many of the studies that have been done on the effects of nutritional supplements on the management of cancer patients is the previously mentioned book by Patrick Quillin (*Beating Cancer with Nutrition*).[8] This is a good place to start for clinicians who wish to incorporate nutritional recommendations, nutritional supplements and other integrative methods while working with cancer patients. They act synergistically and are used most effectively in combination.

(4) Recent Reviews on Nutritional Supplements during Conventional Cancer Treatment: Keith Block MD and Charles Simone MD

Two recent review papers have looked at the question of whether nutritional supplements are beneficial for cancer patients. Keith Block MD and others reviewed 845 peer-reviewed articles that discussed the use of nutritional supplements for patients undergoing conventional treatment. They identified 19 clinical trials, which met strict inclusion criteria. Most of the study participants had advanced or recurrent disease and received various supplements. The conclusion was that: "None of the trials reported evidence of significant decreases in efficacy from antioxidant supplementation during chemotherapy." Many studies showed that antioxidant supplementation was associated with "increased survival times, increased tumor responses, or both, as well as fewer toxicities than controls."[23]

Charles Simone MD (oncologist and radiotherapist who authored a book previously mentioned)[7] reviewed 280 peer-reviewed in vitro and in vivo studies that had been published since 1970. He said that 50 of these studies were human studies involving 8,521 patients, 5,081 of whom were given nutrients. These studies consistently showed that non-prescription antioxidants and other nutrients do not interfere with therapeutic modalities for cancer and actually enhance the killing of conventional cancer therapies and decreased their side effects, protecting normal tissue. In 15 human studies, 3,738 patients who took non-prescription antioxidants and other nutrients actually had increased survival.[24]

Table 1 Dosages of Vitamins, Minerals and Essential Fatty Acids-Jaakkola Study

Vitamins and Fatty Acids	Dosages
Retinol Palmitate (Vitamin A)	15,000 to 40,000 IU
Beta Carotene	10,000 to 20,000 IU
Alpha Tocopherol Acetate (Vitamin E)	300 to 800 IU
Thiamin Hydrochloride (Vitamin B1)	150 to 750 mg
Pyridoxine HCl (Vitamin B6)	200 to 1,140 mg
Cyanocobalamin (Vitamin B12)	30 to 1,600 mcg
Nicotinamide (Vitamine B3)	150 to 400 mg
Vitamin D	400 to 1,000 IU
Ascorbic Acid (Vitamin C)	2,000 to 5,000 mg
Calcium Pantothenate (Vitamin B5)	50 to 300 mg
Biotin	300 to 1,000mcg
Essential Fatty Acids	5 to 65 Grams

Table 2 Minerals Used in Jaakkola Study

- Calcium
- Magnesium
- Zinc
- Manganese
- Selenium
- Copper
- Chromium
- Vanadium

6. Studies Suggesting Efficacy of Nutritional Cancer Supplementation

(1) Small Cell Lung Cancer Study by Jaakkola

There aren't many studies evaluating the efficacy of nutritional supplements in part because there just isn't the economic motivation to do these studies since supplements are not patentable and the vast majority of clinical research is carried out by pharmaceutical companies on clinical trials for patentable drugs. Nevertheless, there are a few suggestive studies, but most physicians aren't aware of them. Even fewer studies have been done on a combination of a variety of supplements. One non-randomized study carried out in Finland and published in 1992 involved 18 patients with small cell lung cancer where patients received a number of vitamins and minerals (several in relatively high doses), along with conventional treatment.[25] The vitamin supplements with dosages used in the study are found in Table 1 and a list of minerals used is found in Table 2.

The endpoint for the study was a simple one, namely the survival time of the patients from the time of diagnosis compared to the survival statistics of The United States' National Cancer Institute's **S**urveillance, **E**pidemiology, and **E**nd **R**esults (SEER) Program for a similar group of patients. The survival statistics are shown in Figure 2. From the time of diagnosis, at 6 months, the survival of the SEER group was 50% and the Nutrient group almost 95%; at 12 months, 20% of the SEER group and 85% of the Nutrient group was still alive; at 24 months, survival for the SEER group was only 10%, while 55% of the Nutrient group was still alive; at 30 months, only a about 1% of the SEER group was still alive while 40% of the Nutrient group was still living and finally at 6 years or 72 months, all of the SEER group had passed on, while 44% (8 of 18 patients) of the Nutrient group was still alive.

Conclusions of the study were: (1) Antioxidants and other nutrients given to small-cell lung cancer patients along with conventional treatment drastically improved long-term survival; (2) "(There) were no side effects observed (from nutrients)"; (3) "Surviving patients started AOX treatment earlier than those who succumbed"; (4) "AOX treatment should start as early as possible in combination with chemo &/or radiation." Granted this was a very small study, but the statistics

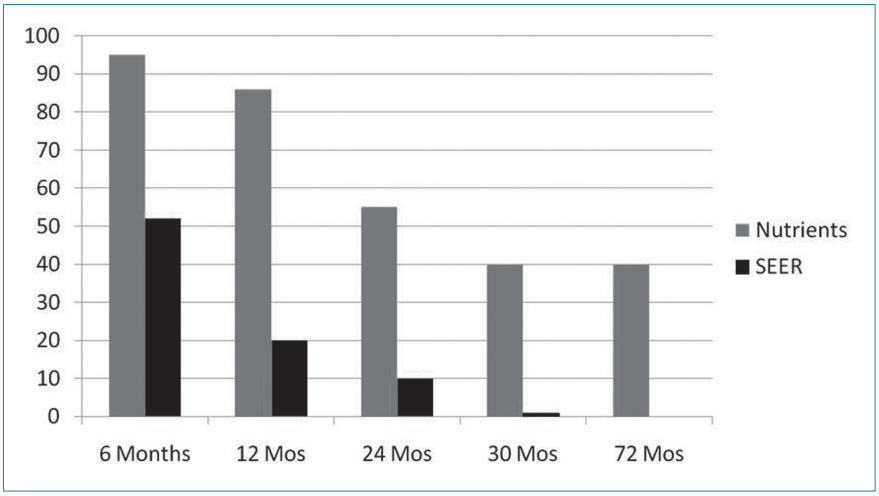


Figure 2　Small Cell Lung Cancer-Survival Statistics

are truly amazing. An unbiased observer would expect that this study would have at least provoked some interest and an attempt would have been made to replicate it, but I could find no evidence of this in the medical literature.

(2) Studies of Abram Hoffer MD on Advanced Cancer Patients Using High Doses of Nutritional Supplements Preceded by Studies of Cameron and Pauling Using High Doses of Vitamin C (Ascorbate): Conflicts with the Mayo Clinic Studies

Linus Pauling, two-time Nobel Prize winner was first introduced to the concept of high-dose vitamin C by biochemist, Irwin Stone in 1966. Being convinced of its worth and championing its use for the common cold, Pauling began to collaborate with Scottish cancer surgeon Ewan Cameron in 1971 on the use of intravenous and oral vitamin C as cancer therapy for terminal cancer patients. The reasoning was that cancer patients were generally depleted of ascorbate and ascorbate had numerous anticancer activities. They conducted a study involving 100 terminal cancer patients in a Scottish Hospital. After 10 days of intravenous Vitamin C therapy, each patient was given 10 grams of vitamin C orally each day indefinitely. Their progress was compared to that of 1,000 similar patients treated identically, but who received no supplemental ascorbate. The mean survival time for the ascorbate group was 4.2 times more than the control subjects (more than 210 days compared to 50 days for the controls). An analysis of the survival-time curves indicated that deaths occurred for about 90% of the ascorbate-treated patients at one-third the rate for the controls and that the other 10% had a much greater survival time, averaging more than 20 times the controls.[26, 27] Cameron and Pauling concluded that high doses of vitamin C should be given to all cancer patients.

The medical establishment rejected the conclusions of Cameron and Pauling after a series of papers from the Mayo Clinic failed to confirm their findings.[28, 29] Pauling bitterly criticized these studies and claimed that they did not replicate his studies.[30] For one thing, in the first study, it turned out that the vast majority of cancer patients in the Scottish study were hospitalized and could be followed very closely and very few of them had previously received chemotherapy (only 4%, though the Moertel published study erroneously indicated that 50% had received chemotherapy), whereas virtually all of the cancer patients in the Mayo Clinic study had received previous chemotherapy.

In the 2nd study, the Mayo Clinic patients (colon cancer patients with metastases for which there was

no known effective conventional treatment) had not received any chemotherapy, but again Cameron and Pauling were critical of this Moertel study. First of all, very few of the control patients were checked to see if they were taking vitamin C on their own. This could be done by checking their urines. When the urine of a few patients in the control group were checked, it turned out that one or more of them were taking C on their own, making the control group invalid. Another major difference between the Moertel study and the original Cameron and Pauling study was that patients in the Cameron-Pauling study were given 10 grams of Vitamin C until they died, whereas the Mayo Clinic patients were given vitamin C until they showed progression of their disease (increase in size of the tumor), at which point they were abruptly stopped from taking ascorbate and given other conventional treatments instead. Cameron and Pauling had not claimed that Vitamin C cured cancer or even that it caused shrinkage of cancerous tumors. They claimed that it slowed the progression of the disease, increased survival time when taken consistently and improved quality of life. This was demonstrated by comparing survival times with 1000 patients who were carefully matched as historical controls.

Moertel's experimental design did not address these issues. Instead, they treated ascorbate as a cytotoxic drug and measured its effectiveness by determining that it didn't shrink any tumors. It was then declared useless. After completion of the Mayo Clinic studies, conventional medicine concluded that vitamin C was useless for cancer patients, in spite of letters from Pauling and Cameron criticizing the experimental design and the conclusions. Vitamin C was relegated to use only by "alternative practitioners".

One recent study outlined the possible proposed mechanisms for ascorbic acid activity in the prevention and treatment of cancer.[31] They are: (1) Enhancement of the immune system by increased lymphocyte production and activity; (2) Stimulation of collagen formation, necessary for "walling off" tumors; (3) Inhibition of hyaluronidase by keeping the ground substance around the tumor intact and preventing metastasis; (4) Inhibition of oncogenic viruses; (5) Correction of ascorbate deficiency commonly seen in cancer patients; (6) Expedition of wound healing after cancer surgery; (7) Enhancement of the anticarcinogenic effect of certain chemotherapy drugs; (8) Reduction of the toxicity of chemotherapeutic agents; (9) Prevention of cellular free radical damage; (10) Production of hydrogen peroxide; and (11) Neutralization of carcinogenic substances. Previously, Cameron and/or Pauling had published several papers, outlining some of these mechanisms.[32-34]

Recent studies from the National Institute of Health suggest high doses of vitamin C (achieved with intravenous doses of ascorbate) induce cancer cell death without harming normal cells. Although these studies have awakened some interest in vitamin C for cancer patients,[35] most cancer specialists today still regard vitamin C as either having no effect or being harmful to cancer patients. Furthermore, although these studies were done at the National Institutes of Health (NIH), the National Cancer Institute (NCI) has not shown any interest in pursuing this line of research.

In the early 1980's, Abram Hoffer MD, (who did the first randomized, double-blind studies in psychiatry, using high doses of niacin for schizophrenia in the mid-1950's), evaluated a schizophrenic patient for treatment with high doses of niacin and vitamin C. This woman also had a lymphoma. Not only did the patient recover from schizophrenia, but much to the surprise of Dr. Hoffer, her lymphoma also went into remission. The word got out and soon Dr. Hoffer was bombarded with requests from cancer patients to be put on a nutritional regimen. At the urging of Dr. Pauling, Dr. Hoffer began to keep track of all of the cancer patients that he put on this nutritional program and reported on the survival time of these patients in a series of articles.

The patients followed by Dr. Hoffer had received conventional treatments and 90% of them were considered to be advanced. The endpoint of the study

Table 3　Dr. Hoffer's First 131 Cancer Patients Treated from 1976 to 88

Group	Treated	Untreated
Total Number	97	18
Alive at 1 year	77%	28%
Alive at 3 years	56%	16%
Alive at 5 years	46%	5%
Alive at 7 years	39%	0%
Alive at 9 years	34%	0%

Table 4　Dr. Hoffer's Cancer Patients Seen before the End of 1997 (71 Excluded)

Group	Treated	Untreated
Total Number	769	75
Alive at 1 year	72%	24%
Alive at 2 years	48%	12%
Alive at 3 years	37%	12%
Alive at 4 years	30%	8%
Alive at 5 years	23%	8%

for each patient was either death or survival time at the time of the inquiry. Time was measured from the first visit with Hoffer. The control group consisted of patients who approached Hoffer, but did not remain in the program for at least 2 months. Excluded were all patients who died during the first 2 months, whether they planned to continue the program or had decided not to do so.[36] This study and related studies are available online at: http://orthomolecular.org/library/jom. Click on search after inserting the search words "cancer", "Hoffer".

The Hoffer protocol given to the treated patients included: (1) Improved diet with the elimination of so-called junk foods (refined, processed foods containing sugar, white flour and additives); low fat and elimination of allergic foods: (2) Vitamin C 10 to 40 grams a day by mouth; (3) Vitamin B3 (Niacin or Niacinamide) 300 mg to 3,000 mg daily; (4) Vitamin B6 200 to 300 mg daily; (5) Folic Acid 1 to 30 mg daily; (6) Vitamin E Succinate 400 to 1,200 IU daily; (7) Mixed carotenoids, as carrot juice; (7) Multivitamin and mineral; (8) Coenzyme Q10 300 mg to 600 mg daily; Selenium 200 to 1,000 mcg daily; (9) Zinc 25 to 100 mg (with some copper); (10) Calcium and magnesium in a 2:1 ratio. Most nutrients were given in divided dosages two to three times daily.

The survival statistics for Dr. Hoffer's first 131 patients treated between 1976 and 1988 are shown in Table 3. At the end of one year, 28% of the controls were alive compared to 77% of the treated group. At 3 years, 16% of the control group was alive compared to 56% of the treated group. By 5 years, 5% of the control group and 46% of the treated group were alive, while at 7 and 9 years, there were no survivors in the control group, but 39% and 34% respectively in the treated group. The survival statistics for 769 patients through 1997 are shown in Table 4. Again, we see a marked difference in survival each year up until 5 years.

The conclusions from the Hoffer studies were: (1) Patients with a wide variety of advanced cancers have significantly improved survival when a nutritional program is added to their conventional treatment; (2) The nutritional program consisted of dietary suggestions and relatively high doses of vitamins, minerals and other nutritional supplements.

7. Intravenous Vitamin C for Cancer Patients

The first recommendations for IV Vitamin C for cancer patients appeared in 1971.[37] In their book on cancer and vitamin C, Cameron and Pauling summarized their work with vitamin C for cancer patients both orally and by intravenous use.[38] In their study, IV Vitamin C at 10 grams was administered daily for 10 days. In 1990, the late Hugh Riordan MD and his group in Wichita Kansas reported a rather amazing case study of a patient with kidney cancer who had a long-term remission with IV treatments of Vitamin C in the range of about 15 to 30 grams, a few times a week.[39] A paper in Medical Hypothesis in 1995 by

Riordan's group described IV ascorbate as a tumor cytotoxic chemotherapeutic agent.[40] They reported that ascorbic acid and its salts are preferentially toxic to tumor cells in vitro and in vivo and that "given in high enough doses to maintain plasma concentrations above levels that have been shown to be toxic to tumor cells in vitro, ascorbic acid has the potential to selectively kill cancer cells in a manner similar to other tumor cytotoxic agents." A major point here is that at these concentrations, ascorbic acid is NOT toxic to normal cells.

Mark Levine MD at the NIH wrote a commentary in the Journal of the American College of Nutrition in 2000 pointing out that concentrations in the bloodstream of IV vitamin C was capable of killing cancer cells and not normal cells and that "ascorbate treatment of cancer should be reexamined by rigorous scientific scrutiny in the light of new evidence."[41] As mentioned previously, Mark Levine MD and his group at the NIH published an extremely important paper in 2005, showing that high concentrations of ascorbate (achievable by IV infusions, but not by oral doses) was capable of killing a wide range of cancer cells without harming normal cells. Furthermore, he described the mechanism by which this occurs. Ascorbate in these high concentrations acted as a pro-drug, forming hydrogen peroxide in the extracellular spaces. It is the hydrogen peroxide that is capable of killing many cancer cells and not normal cells at these concentrations.[26] The reason for the discrepancy in ascorbate's ability to kill cancer cells and not normal cells may be that cancer cells have between 10 and 100 times less catalase than normal cells.[30, 42] Catalase is the enzyme that breaks down hydrogen peroxide in the body and with less catalase, cancer cells might be expected to be more easily killed by hydrogen peroxide. More case studies were published in 2006.[43] In this paper, the authors describe: "3 well-documented cases of advanced cancers, confirmed by histopathologic review, where patient had unexpectedly long survival times after receiving high-dose intravenous vitamin C therapy." They suggested that "the role of high-dose intravenous vitamin C therapy in cancer treatment should be reassessed. A nice review of ascorbic acid for cancer over the previous 25 years appeared in 2005.[44]

Recently, John Hoffer MD (son of Abram Hoffer) and a professor at McGill University reported at a meeting in Orthomolecular Medicine (2009) that a clinical trial that he had run on advanced cancer patients using high dose IV ascorbate over a 6-month period, failed to show any objective changes in the size of the tumor. The conclusion was that the IV ascorbate alone was not effective for the treatment of advanced cancers. However, Dr. John Hoffer used the same methods that are used to evaluate toxic chemotherapeutic drugs and similar to the methods used by Dr. Moertel in his studies described previously. Measuring the size of a tumor does not necessarily correlate well with either survival time or quality of life. So, it is possible that a longer term study which looked at the issues of survival time and various lifestyle parameters might show a different story. But, it would undoubtedly be difficult to get funding for such a study. On the other hand, a study involving IV ascorbate along with a chemotherapeutic agent would be funded more easily. Currently, Dr. Hoffer is recruiting for a clinical trial using high dose Vitamin C with chemotherapy. This is similar to a trial run at the University of Kansas by Dr. Jeanne Drisko, which has not yet been published. It is not clear at this time if clinical trials of this sort using IV Vitamin C along with chemotherapy will show vitamin C to be of benefit, but I suspect if parameters, such as survival and quality of life are measured, we should expect positive results. In my clinical experience, patients undergoing chemotherapy with another physician, but receiving high dose intravenous ascorbate at our office in between their chemotherapy treatments, invariably report that they appear to be doing better than other patients at the oncologist's office who are not receiving high dose vitamin C.

In our practice at the Schachter Center for Complementary Medicine in Suffern, NY (www.schachter-

center.com), we have been using high dose IV ascorbate (10 to 120 gram infusions) in cancer patients for more than 30 years. Each patient receives a comprehensive program involving dietary suggestions, a variety of nutritional supplements, an exercise program, stress management program and other life style enhancing suggestions. Our patients appear to do very well and we believe that the C infusions play an important role in their treatment. We usually give about 60 grams of vitamin C, 10 cc of Calcium Gluconate and 4 cc of Magnesium Chloride in 500 cc of sterile water and administer this over about 2 hours.

8. Historical Background of Amygdalin (Also known as Laetrile and Vitamin B17)

(1) Historical Background

Amygdalin has been one of the most controversial cancer treatments for the past 50 years. The story involves not only science, health care and treatment for cancer, but also politics and economics. In the USA, during the 1970's and 80's a great debate waged between conventional medicine (with the support of the federal government) on the one hand and patients treated successfully with it, a small group of scientists and practitioners who believed in its value and a conservative political group that fostered the notion of freedom of choice in health care, on the other. As many as 20 states in the USA passed state legislation that decriminalized it, while some doctors who used it lost their medical licenses and some even wound up in prison. My first exposure to alternative cancer therapies was a narrated film strip titled "World without Cancer", which is available on the internet at: http://video.google.com/videoplay?docid=4312930190281243507#. It is also available as a book: *World without Cancer* By Edward Griffin.[45] The basic thesis of this book, based on the theory of Ernest Krebs Jr, is that cancer is largely a nutritional deficiency disease, much like pellagra (Vitamin B3), scurvy (vitamin C) or beri-beri (vitamin B1) and that modern civilization ingests very little of this vitamin, which is contained in nitriloside-rich foods. A monograph with references on amygdalin is available at: http://www.worldwithoutcancer.org.uk/therapycomponents.html#14

During the late 1970's and early 1980's, I personally was involved in a legal struggle with New York State that involved amygdalin and other alternative cancer therapies. Fortunately for me, I was able to come out of this struggle without much damage to me or my practice. I have been recommending amygdalin as a nutritional supplement for cancer patients since the mid-1970's and believe that it does have value, along with many of the other suggestions and recommendations that we give to our patients.

(2) Chemical Structure of Amygdalin and How it Works

To briefly summarize information about amygdalin and nitrilosides, the following is offered: Amygdalin is one of many nitriloside compounds, which are natural cyanide-containing substances found in many foods, including all of the seeds of the prunasin family (apricots, peaches, apples, pears and others), millet, buckwheat, cassava melons and many others. Amygdalin consists of two sugar (glucose) molecules bound to a benzaldehyde, which in turn is bound to a cyanide radical (the benzaldehyde-cyanide radical is called mandelonitrile). Both benzaldehyde and the cyanide radical are potentially damaging to cells, but are quite harmless, while they are bound to the two sugar molecules. As a result of this lack of toxicity while the entire molecule is intact, large quantities of amygdalin (at least 9 grams) can be given as a short intravenous infusion or even as an intravenous push with virtually no side effects or problems.

In the body, the two sugar molecules are split off by the enzyme beta glucosidase (probably by bacteria in the colon) and are replaced by a glucuronic acid molecule to form a compound consisting of glucuronic acid bound to mandelonitrile (the benzaldehyde-cyanide radical). This is actually the true Laetrile, according to Dr. Krebs, and it differs from the original amygdalin,

which has two glucose molecules instead of the glucuronic acid. An enzyme known as beta glucuronidase, which is found in high concentration in cancer cells (but is very scarce in normal cells) splits off the glucuronic acid, leaving benzaldehyde bound to cyanide (mandelonitrile). Once glucuronic acid is split off, the remaining benzaldehyde-cyanide radical spontaneously splits off cyanide, which is toxic to the cancer cell; cancer cells do not have sufficient quantities of any enzyme capable of breaking down or converting the cyanide to a less toxic compound whereas normal cells do. Hence, there is a selective toxicity to cancer cells.[46] Benzaldehyde, like formaldehyde, can also be toxic to cancer cells. So, both benzaldehyde and cyanide are released at the site of the cancer cells and can damage them.

The precise mechanism for amygdalin's selective toxicity to cancer cells but not normal cells involves the protective action of enzymes present in normal cells but lacking in cancer cells. An enzyme present in high concentration in normal cells but very low in cancer cells is the enzyme rhodanese or sulfur transferase. This enzyme transfers a sulfur atom onto the cyanide radical to create the relatively non-toxic thiocyanate. Cancer cells have trouble doing this because they lack this enzyme. So, the cancer cells get the toxic effects of cyanide while the small amount of cyanide released around normal cells is converted to thiocyanate. Blood thiocyanate levels may be used to help monitor the proper dose of amygdalin, helping to make sure that toxic levels of cyanide are not reached but that therapeutic levels are present. Of particular interest is that conventional medicine has used serum thiocyanate to help determine the dosage of their emergency anti-hypertensive drug nitroprusside, a medication that contains a cyanide radical. This drug is still used in emergency rooms for hypertensive crisis. I use the suggested therapeutic range of thiocyanate for nitroprusside to help me monitor appropriate doses of amygdalin.

Studies also indicate that benzaldehyde has anti-cancer activity, as it combines with cysteine in cancer cells, inactivating various proteins. Cancer cells do not have enzymes capable of converting benzaldehyde. Normal cells, on the other hand, have enzymes capable of oxidizing benzaldehyde to benzoic acid, rendering it harmless to normal cells. Hence, we have a selective toxicity to cancer cells and not normal cells. Incidentally, benzoic acid is converted in the body to hippuric acid, which is discharged in the urine and protects against urinary tract infections.

(3) Clinical Studies and Critiques

Many epidemiological studies, animal studies and some clinical reports show evidence of amygdalin's efficacy. However, conventional medicine has taken the position that it is useless and/or harmful. It is generally regarded as the height of quackery. Most of the negative views of amygdalin emanate from a study by the late Dr. Charles Moertel of the Mayo Clinic, whose article was published in the NEJM in 1982.[47] This is the same Dr. Moertel who carried out the studies on vitamin C for cancer that were discussed earlier in this article. He was a long time opponent of any so-called alternative cancer treatments.

A number of criticisms of this study have been published. A summary of them can be found at: http://www.ispub.com/journal/the_internet_journal_of_alternative_medicine/volume_7_number_1_22/article/does_laetrile_work_another_look_at_the_mayo_clinic_study_moertel_et_al_1982.html. One issue was that rather than chemically pure amygdalin, a mixture that supposedly mimicked what was being used in a Mexican Clinic was used. The patients were treated with IV amygdalin for 3 weeks and then switched to oral amygdalin. During those 3 weeks, 70% of the patients were stable. When they were switched to only oral amygdalin, a large percentage deteriorated. Supporters of amygdalin therapy do not believe that this study proves amygdalin to be useless.

The adult oral dosage for an adult is approximately 500 mg three times daily but the dosage can be increased or decreased depending upon the patient's clinical response and the results of serum thiocyanate levels. For most adults, the IV dosage that we use is 9 grams, dissolved in a small IV infusion of 100 ml of

sterile saline. It is dripped in over 10 to 20 minutes. In our Center, we usually administer an IV vitamin C drip and follow it with a drip of amygdalin.

Two cautions should be kept in mind when using amygdalin. First, it is necessary for patients using amygdalin to have a sufficient source of sulfur in the diet so that any excessive cyanide formed near normal cells can be converted to thiocyanate by the addition of sulfur. A relatively inexpensive supplement source is methyl sulfonyl methane (MSM). Secondly, because thiocyanate tends to be suppressive to the thyroid gland, it is essential to have sufficient iodine to overcome any suppression of the thyroid gland by thiocyanate. Iodine as a nutrient with anti-cancer properties will be discussed below.

9. Iodine: The Most Misunderstood Nutrient

Iodine supplementation should be considered in all cancer patients. Dr. Max Gerson successfully treated many cancer patients with a variety of unconventional techniques including more than 10 glasses a day of raw vegetable juice daily, coffee enemas, a vegan diet, flaxseed oil, cod liver oil, thyroid hormone and Lugol's solution which contains relatively high concentrations of iodine.[48] Prior to World War II, Lugol's solution was used by numerous physicians worldwide to treat many different conditions. Since them, with the growth of pharmaceutical companies and the widespread use of patentable drugs, inorganic, non-radioactive iodine has not been used for cancer patients or for patients with other disorders who would have previously been treated with iodine.

(1) Guy Abraham MD and the Iodine Project

Guy Abraham MD, former professor of obstetrics, gynecology and endocrinology at UCLA School of Medicine, has written a series of papers about iodine that has drastically changed my thinking about its role in health and the prevention and treatment of disease. He terms this series of papers "The Iodine Project".

I had been impressed by Dr. Abraham's previous work that showed that vitamin B6 and magnesium could be helpful to women with premenstrual syndrome (PMS) and I was anxious to learn what he had to say about iodine. Through a series of articles, (all of which are available for free download at: http://www.optimox.com/pics/Iodine/opt_Research_I.shtml) Dr. Abraham has proposed that the optimal daily dose of iodine for an adult is approximately 12.5 mg to 50 mg daily, which is close to 100 to 400 times the RDA of 0.150 micrograms (mcg) daily. He believes that the current prevailing medical opinion, that more than 2 mg a day of iodine is toxic, is wrong.

(2) How We Went Wrong: The "Wolf-Chaikoff Effect"

He traces the source of this mistaken notion about the toxicity of iodine to a scientific experiment on rats that was published in 1948 by Drs. Wolff and Chaikoff,[49] From this experiment, the authors erroneously concluded that iodine inhibits the thyroid gland and can cause goiter at doses of about 20 times the recommended daily allowance (RDA) for iodine. This conclusion was indeed surprising since they had not bothered to check the thyroid hormone levels and actually reported no evidence of an enlarged thyroid (goiter) in any of these rats. This conclusion was reiterated by Wolf again in 1969[50] and in this paper, he generalized his findings to humans. Subsequently, his conclusion was found in medical textbooks, including endocrinology and nutrition textbooks. For example, the Merck Manual online states: "Chronic toxicity may develop when intake is > 1.1 mg/day"[51] Even the Linus Pauling Institute on its website says: "The RDA for iodine is sufficient to ensure normal thyroid function. There is presently no evidence that iodine intakes higher than the RDA are beneficial. Most people in the U.S. consume more than sufficient iodine in their diets, making supplementation unnecessary."[52] This conclusion, that more than 2 mg of iodine daily in humans can cause hypothyroidism and goiter, is particularly more difficult to understand when as early as 1923, David Marine showed

that 9 mg a day of iodine was safe and actually prevented the development of goiter. In a controlled study used 9 mg of sodium iodide in 2,190 students for 2.5 years, Marine found that the incidence of goiter in the group receiving the 9 mg of iodine daily was 0.2% with no evidence of adverse effects, while the control group that did not receive any iodine had an incidence of goiter of 22%.[53)]

How did such an error occur in the original Wolf-Chaikoff experiment? The intent of Wolf and Chaikoff was to determine the effects of inorganic non-radioactive iodine on the thyroid gland in rats. They gave gradually increasing doses of iodine and then used the radioactive iodine uptake test to see what effect these doses had on the thyroid. At that time, the interpretation of the test results was as follows: If the radioactive iodine uptake of the thyroid was suppressed, it was interpreted to mean that the non-radioactive iodine inhibited the thyroid and this phenomenon occurred at what would be about 2 mg of iodine in humans. Since at certain levels of iodine intake the radioactive iodine test showed virtually no iodine uptake, Wolf and Chaikoff decided that the treatment dose of iodine must have inhibited the thyroid gland and therefore iodine causes hypothyroidism and possibly goiter.

Abraham reinterpreted these findings and concluded that rather than showing that this amount of iodine inhibited the thyroid, it really showed that this level of iodine made the thyroid gland sufficient in iodine, and, therefore, it did not need to take up any more iodine. He asserted that the Wolf-Chaikoff interpretation, which became known as the "Wolf-Chaikoff Effect", was absolutely wrong, though it became the focus of attention for the entire health care industry. According to Abraham, this set back health care progress for decades.[54)] Abraham defines and describes the term "medical iodophobia" as the "unwarranted fear of using and recommending inorganic, non-radioactive iodine/iodide within the range known from collective experience of three generations of clinicians to be the safest and most effective amounts for treating symptoms and signs of iodine/iodide deficiency (12.5 to 50 mg/day)."

(3) Other Reasons for Physicians Believing Iodine is Toxic

There are other reasons for the belief among most health care practitioners that iodine is toxic and dangerous. Allergies to seafood are moderately frequent. A person who is allergic to seafood or specific seafood such as shrimp, will often say that he/she is allergic to iodine because seafood isn't tolerated. The allergy, however, is to a protein or proteins within the seafood (that might or might not contain iodine) and not to iodine itself. The vast majority of patients with seafood allergy can tolerate inorganic, non-radioactive iodine.

Another common allergic reaction occurs when radiographic contrast medium containing iodine is given to a patient for an imaging study and there is an allergic response. The patient is told that he is allergic to iodine when in fact the person is reacting to the whole iodine containing compound and likely could tolerate non-radioactive, inorganic iodine. However, patients and their clinicians often think this means the person is allergic to iodine.

Another example involves the anti-arrhythmic drug Amiodarone. Although a reasonably effective medication, it is quite toxic and side effects may include death. Every 200 mg tablet of Amiodarone contains 70 mg of Iodine and 9 mg of iodine is released daily over time from the tablet. Medicine has assumed the toxicity of Amiodarone is due to its iodine content but a study in 1993 suggests that iodine is the therapeutic component and the rest of the molecule causes the toxic effects.[55)] Table 6 summarizes the various forms of iodine/iodide used in clinical medicine.

(4) Iodine Needed by All Cells and Organ Systems in the Body: Not Just the Thyroid

The commonly accepted medical opinion is that iodine's only role in the body is to help make thyroid hormones. Although this is an extremely important

Table 6　Various Forms of Iodine/Iodide Used in Clinical Mediciine

- Inorganic
  - -Non-Radioactive
    - Iodides (e.g. SSKI)
    - Tincture of iodine
    - Lugol's solution
  - -Radioactive Iodides for diagnostic and therapeutic purposes
- Organic
  - -Naturally Occuring
    - Thyroid hormones
    - Thyroidal Iodolipids
  - -Man-made
    - Radiographic contrast media
    - Iodine-containing drugs (e.g. Amiodarone)

function, Abraham demonstrates that the role of iodine in the body goes far beyond its function of making thyroid hormones. In addition to the thyroid gland, every cell of the body uses iodine. The RDA for iodine of 150 micrograms daily (0.15 mg) is generally sufficient to prevent goiter and to prevent cretinism in infants when the pregnant mother ingests this dosage. However, this dosage is totally insufficient to supply all of the needs of all cells in the body. For example, Finley reported that fibrocystic breast disease could be reversed with 5 mg or more of iodine daily.[56] Ghent using 5 mg of iodine daily for a year was able to reverse fibrocystic breast disease in more than 90% of the women in the study.[57] Flechas in a paper at the www.optimox.com website says that he is able to clear fibrocystic breast disease in women within 3 months using 50 mg of iodine daily.[58]

Other possible functions of iodine include: helping to regulate mood, preventing cancer (especially in breast, ovarian, uterine, prostate and thyroid gland cancers), helping to regulate blood pressure, helping to regulate blood sugar and prevent and treat diabetes, and helping to prevent abnormal cardiac rhythms. With regard to cancer, in many areas of Japan, Japanese women, who have one of the lowest breast cancer rates in the world, ingest more than 13 mg of iodine daily from seaweed without suffering any adverse consequences and iodine may be an important factor in this low rate of breast cancer. Dr. Abraham further demonstrates that iodine tends to be antibacterial, antiviral, antiparasitic and antifungal and that it enhances immune function. No microorganism has ever been found to be resistant to iodine. Furthermore, he suggests that suboptimal iodine intake may contribute to various thyroid abnormalities commonly seen today, including hypothyroidism (underactive), hyperthyroidism (overactive) and autoimmune inflammation of the thyroid (Hashimoto's Disease).

(5) Different Forms of Inorganic Iodine/Iodide in the Body and Organ Preferences

Dr. Abraham started this Iodine Project around 1998 when he became aware of the many benefits of treating patients with iodine using doses far beyond the 2 mg a day that most physicians consider to be potentially toxic. He noted that starting in the 1820's, the French physician, Jean Lugol used these higher doses to treat a wide variety of conditions. Dr. Lugol combined elemental iodine (5%) and potassium iodide (10%) with 85% water. He found that combining the two resulted in elemental iodine being much soluble than when it was used alone. Since iodine kills infectious agents, Dr. Lugol successfully treated many infectious

conditions with this solution, now known as Lugol's solution, which is still available today by prescription. Prior to World War II, many American and European physicians used Lugol's solution to treat thyroid conditions, using doses higher than 2 mg daily without apparent significant adverse effects.

Dr. Abraham notes that research has shown that the thyroid gland prefers to utilize the iodide form of iodine, while other organs, such as the breast and ovaries, prefer the elemental form of iodine.[59] Both of these forms are present in Lugol's solution. He points out in his preface to Dr. David Brownstein's book *Iodine: Why You Need It; Why You Can't Live Without* It:

"Of all the elements known so far to be essential for human health, iodine is the most misunderstood and the most feared. Yet, iodine is the safest of all the essential trace elements, being the only one that can be administered safely for long periods of time to large numbers of patients in daily amounts as high as 100,000 times the RDA. However, this safety record only applies to inorganic nonradioactive forms of iodine…Some organic iodine containing drugs are extremely toxic and prescribed by physicians. The severe side effects of these drugs are blamed on inorganic iodine although studies have clearly demonstrated that it is the whole molecule that is toxic, not the iodine released from it."[60]

(6) Determining Total Body Iodine Sufficiency: The Iodine Loading Test

In his excellent short book on iodine, Dr. Brownstein summarizes his own clinical experience with hundreds of patients for whom he has prescribed iodine with excellent results and minimal side effects. To determine whether a patient is iodine sufficient, he uses the iodine-loading test described by Dr. Abraham and now in use at the Schachter Center. This was the test that Abraham used to determine if a person had an optimal amount of iodine in his/her body. Other research had shown that iodine is readily absorbed when ingested orally and readily excreted in the urine. The assumption was that if a person ingests a given amount of iodine and is iodine sufficient, most of the iodine should be found in the urine over a 24-hour period. On the other hand, if the person does not have an optimal amount of iodine in his body, when he ingests the iodine, his body will tend to hold onto it and a smaller amount will be found in the urine during the 24-hour collection period.[46]

To do this test, a patient first empties his bladder and then ingests 50 mg of iodine/iodide. The patient then collects his urine for the next 24 hours and sends a sample of it along with a note that includes the total volume collected is sent to an appropriate laboratory. If the person excretes 90% or 45 mg of the iodine, he is considered iodine sufficient. If less is excreted, the patient is not optimally sufficient or is iodine insufficient and a therapeutic dosage of iodine may be administered for a period of time and then the test is repeated. Dr. Brownstein has found in using this test that more than 90% of his patients are iodine insufficient. Once a person is iodine sufficient, the maintenance dose for an adult to maintain sufficiency is about 12.5 mg of iodine/iodide daily. The treatment dose when a person is iodine insufficient is generally between 12.5 mg and 50 mg daily. Preliminary research indicates that if a person is iodine insufficient, it takes about 3 months to become iodine sufficient while ingesting a dosage of 50 mg of iodine and a year to become iodine sufficient while ingesting a dosage of 12.5 mg of iodine daily. However, the patient needs to be monitored closely with awareness of possible side effects and detoxification reactions. Cancer patients taking 50 to 100 mg of iodine daily may take more than a year to achieve iodine sufficiency as defined by this test.

The dosage of about 12.5 mg of iodine daily can be obtained with 2 drops of Lugol's solution or from an identical over-the-counter solution. This same dosage is also available in an over-the-counter tablet or capsule. Each capsule or tablet or 2 drops of the Lugol's solution contains 5 mg of the reduced elemental form of iodINE (preferred by the breast, ovary and prostate) and 7.5 mg in the iodIDE form (preferred

by the thyroid gland). Numerous testimonials indicate that many patients improve a variety of symptoms with optimal supplementation of this supplement.

(7) Detoxification Effects of Iodine and Protocol for Avoiding Adverse Effects

This dose of iodine may have other benefits as well. Dr. Abraham has shown in his work that iodine promotes the excretion of toxic minerals, such as lead, mercury and cadmium, as well as the toxic halogens fluoride and bromide. In the May 2005 edition of *Nutrition and Healing*, Jonathan V. Wright MD notes that his laboratory has also shown that iodine helps remove toxic elements, including bromide and fluoride, from the body. With this mobilization of toxic elements, patients may develop temporary side effects such as fatigue, irritability, palpitations or anxiety that can be reduced by lowering the dosage of iodine and making sure that other aspects of nutrition and nutritional supplementation are in place.

Dr. Brownstein suggests a protocol that we are currently using when iodine is recommended. The protocol includes: checking your body weight in pounds and drinking at least one-half your body weight in ounces of pure water every day (juices, tea and other beverages do not count); 1 to 2 tspf of unrefined salt daily (1/4 teaspoonful of unrefined salt can be added to a quart of water (blood pressure should be monitored for the occasional person who is very salt-sensitive), daily doses of 200 to 400 mcg of Selenium, 3 to 6 grams of vitamin C in divided dosage, and 300 to 1,200 mg of an absorbable form of magnesium (like magnesium glycinate). Side effects or intolerances to the quantities of these supplements, such as diarrhea or frequent bowel movements to vitamin C or magnesium need to be checked and dosages adjusted as necessary. All of these should be in divided dosage of about 3 times daily. This helps to reduce toxic side effects of bromine mobilization from tissues when iodine is supplemented. A physician knowledgeable about iodine who can order appropriate tests when necessary should monitor this procedure.

(8) The Possible Role of Iodine in Preventing and Treating Cancer: Counteracting Carcinogenic Agents (such as Bromine and Fluoride) while Promoting the Formation of Iodinated Lipids

Iodine's role in helping to prevent and treat cancer needs much more exploration and research but there is suggestive evidence that it plays a role in preventing and/or treating cancer (especially involving the thyroid gland, breasts, prostate, ovaries and uterus). As mentioned previously, Max Gerson MD, whose successful alternative therapy involved using fresh vegetable juices and intensive detoxification, recommended Lugol's solution for all of his cancer patients. Numerous rat studies by Eskin show a direct relationship between iodine deficiency and breast abnormalities including cystic mastopathy and breast cancer.[61-63] According to Brownstein, when Eskin applied to the NIH for grants to do studies on humans, he was refused funding because of the Wolf-Chaikoff Effect.

Iodine deficiency predisposes to breast cancer and high fat diet predisposes to Iodine deficiency.[64] Japan and Iceland have high Iodine intake and low goiter and breast cancer rates, just the reverse occurs in Mexico and Thailand.[65] Iodine protects against estrogenic effects in breast cancer.[66, 67] Thyroid hormone therapy contributes to breast cancer in Iodine deficient women.[68] Female rats require 20 to 40 times the amount of Iodine needed to control breast cancer & fibrocystic disease than to prevent goiter.[69] When Iodine was used in dough during the sixties, one slice of bread a day contained the RDA of 150 mcg. The average iodine intake was > 700 mcg daily and the breast cancer risk was 1:20. With the replacement of Iodine in bread dough by the goitrogen bromine in the early 1980's, the average iodine intake was reduced below the RDA of 150 mcg and the rate of breast cancer increased to 1:8 (absorption of iodine from bread is much better than from iodized salt). This seems to me to be a totally unrecognized correlation that may be causal in nature. It wouldn't be the first time that a disastrous public health decision

was made. As a result of exposure to goitrogens, including the addition of bromine to all baked goods, the amount of iodine needed to counteract the effects of these goitrogens has drastically increased. This is one of the main reasons that the average person needs so much iodine for optimal functioning. One researcher commented that to overcome the effects of goitrogens in the food chain such as bromine in dough, daily amounts of Iodine ingested in Japan would be necessary (referring to the 13 mg daily in Japan).[70)]

David Brownstein MD, in his previously mentioned book, describes 3 cases of breast cancer that did remarkably well with an intake of iodine in the 50 mg range. A 63 year old female English teacher, diagnosed with breast cancer in 1989, declined conventional treatment and took 50 mg per day of Iodoral, (Iodine). Six weeks later, a PET scan showed "all of the existing tumors were disintegrating". A 73 year old diagnosed in 2003, declined conventional treatment and took 50 mg of Iodoral daily. An ultrasound of the breast 18 months later showed reduction in size of the tumor. Two years later, there was no evidence of cancer. A 52 year old woman with breast cancer and no conventional treatment was given 50 mg per day of iodine. Three years later, mammograms and ultrasound exams showed decreasing size of the tumor with no progression.

At higher doses of iodine in the range of 50 mg daily, iodine combines with lipids to form iodinated lipids such as Delta-Iodolactone that causes apoptosis in cancer cells. RDA levels (microgram doses) do not do this. Recent work shows strong anticancer activity in breast cancer cells.[71)] Research in this area is beginning to pick up worldwide.

A website with more information about the relationship between insufficient iodine and breast cancer is: http://www.breastcancerchoices.org/. Given all of this information about breast cancer and some epidemiologic evidence relating to higher incidence of prostate and thyroid cancer in iodine insufficient areas, it seems reasonable to consider that suboptimal iodine levels may play a role in many, if not all cancers, and that Gerson was correct in giving all of his cancer patients iodine as Lugol's solution.

(9) Countering Goitrogens with Iodine and Iodine as an Anti-infectious Agent: Uses to Purify Water and for Swimming Pools and Spas

Iodine insufficiency problems are aggravated by our use of agents that interfere with the utilization of iodine (sometimes called goitrogens because they may cause an enlargement of the thyroid gland). These include the halogens (class of chemicals to which iodine belongs) fluoride, bromine and bromides and chlorine. Fluoride is added to 50% of the U.S. water supplies, is present in most toothpaste, and is used in fluoride dental treatments for children. It is also present in many processed foods and beverages. Fluoride can interfere with iodine utilization. Critics of fluoridation and use of other fluoride products believe that fluoride is carcinogenic and has many other side effects. In the case of fluoride, we have also been sold a bill of goods based largely on economic motivations. In the 1940's, due to deaths of livestock from fluoride emanating from industrial plants such as aluminum and fertilizer factories, the AMA and ADA considered fluoride to be an environmental pollutant, which it is. As a result of a massive public relations campaign and some very weak science, fluoride became an essential nutrient that protects against dental decay. It was added to the water supply, used by dentists to treat the teeth, used in fluoridated toothpaste and given to babies to prevent dental decay. Aside from causing dental fluorosis (ugly white spots on the teeth of children) in many children, fluoride became another risk factor for many degenerative diseases including cancer. Did the public health system under the influence of corporate dollars make a mistake with regard to improving the health of the public? In my opinion, it did, but the predominant conventional view is still that fluoride is harmless and beneficial the way it is used. As mentioned previously, I advise all of my patients to avoid fluoride as much

as possible. Possible mechanisms for damaging effects of fluoride must include its interference with the proper utilization of iodine.

Bromine replaced iodine in most baked goods in the 1980's because of the concern that iodine might be toxic. In fact, it is the bromine that is toxic. Bromine interferes with iodine utilization. Bromine is also used to disinfect hot tubs and is present in many medications including many asthma medications. It is also currently present in certain soft drinks such as Mountain Dew and certain Gatorades. Bromine is present in many pesticides and herbicides, fabrics, the interior of new cars, electronic equipment and many other common products.

Chlorine, used to treat swimming pools and present in many of the public drinking water supplies, also interferes with iodine levels in the body. Safer water purification systems, like ozone and iodine, itself, exist but are currently not widely used.

The use of iodine to prevent infections in drinking water supplies and in swimming pools is far superior and less expensive than the use of chlorine or bromine with concentrations of iodine at 1 to 2 ppm.[45, 72-75] In these studies, iodinated drinking water was found to be safe and tasty. Competitive swimmers consistently found pools cleansed with iodine as compared to chlorine were less irritating and preferred the iodinated swimming pool water. The advantage of using iodine for these purposes is that it would help people get the essential nutrient iodine they need while at the same time cleansing the water effectively. However, the pervasive fear of iodine by the health care industry and governmental agencies has not allowed this to happen. One reason that swimming pools may need something in addition to iodine is that the iodine at this concentration does not get rid of algae in the swimming pool. Consequently, chlorine shocking may still be necessary occasionally.

(10) Sources of Iodine: Problems with Iodized Salt

Most people get iodine in their diet from seafood and iodized salt. However, only about 50% of Americans use iodized salt in part, no doubt, because of concerns about high blood pressure that has resulted in many people reducing their salt intake. One gram of salt contains 77 mcg of iodine. The iodine present in iodized table salt is poorly absorbed and one study indicated that only about 10% of the iodine in iodized salt is actually absorbed.[76] In contrast, the iodine absorbed from baked goods when iodine was used as a dough conditioner is about 90%. The recommended daily allowance (RDA) of iodine is 150 mcg (somewhat higher for pregnant women and certain other groups). Though 150 mcg daily may be sufficient to prevent an enlarged thyroid (goiter) and cretinism (severe iodine deficiency in babies leading to mental retardation and impaired development), these values are far short of the optimal values of 12,500 mcg (12.5 mg) recommended by Dr. Abraham. But, even using the lower values, many people still do not get the RDA and tests have shown that the average blood levels of iodine have decreased significantly over the past 30 years, in part no doubt, due to the substitution of bromide for iodide in baked goods in the early 1980's. According to the last national nutritional survey (NHANES III 1988-1994), 15% of the U.S. adult female population has moderate to severe iodine deficiency as defined by the World Health Organization: levels of iodine/iodide below 50 mcg/L, present in a random urine specimen. Therefore, 1 in 7 women in the U.S. are frankly iodine deficient.[77]

(11) International Iodine Problems

Worldwide, the soil in large geographic areas is deficient in iodine. Twenty-nine percent of the world's population, living in approximately 130 countries, is estimated to live in areas of deficiency. WHO Claims that iodine deficiency is the world's greatest single cause of preventable mental retardation. Iodine is the most deficient trace mineral in the world. 1/3 of all peoples are deficient.[78] Iodine deficiency is the number one cause of under functioning intellect.[79] The best way to cripple a nation is to make the people iodine deficient. Mild iodine deficiency is defined as levels between 50 and 100 mcg/L found in a random

Table 5　Worldwide Iodine Deficiency

Iodine Deficiency	None	Mild	Moderate	Severe
Median Urine Iodine, mcg/ Liter of spot urine	>100	50-99	20-49	<20
Goiter prevalence	<5%	5-20%	20-30%	>30%
Neonatal TSH > 5 IU/ml Whole blood	<3%	3-20%	20-40%	>40%
Cretinism	0	0	+	+

Adapted from the world Health Organization (WHO)/United Nations Children's Fund (UNICEF)/International Council for Control of Iodine Deficiency Disorders (ICCIDD). (From Medscape 8-09)

urine sample. Moderate deficiency occurs at iodine levels between 20 and 50 mcg/L. Severe deficiency is defined as a level below 20 mcg/L. The relationship between various levels of iodine deficiency and the prevalence of goiter, likelihood of elevated TSH (low thyroid) and presence of cretinism are shown in Table 5. Goiter and elevated TSH drastically increases as the iodine level in the urine is reduced. In spite of this clear problem of iodine deficiency using even the WHO criteria, physicians in the USA NEVER order urinary iodine levels or serum iodine levels even though the tests are available from commercial laboratories. In my 40 years of practicing medicine, I never ordered an iodine test and never heard of any physician who did. It is only after learning about iodine issues from Guy Abraham's papers that I began to order the tests.

The concentration of iodine in urine of people who are not supplemented with the higher doses of iodine discussed previously (12.5 to 50 mg daily) is two orders of magnitude less than that found in the urine of supplemented patients (5 to 10 or more mg/L of iodine). The concentration of iodine in serum is also two orders of magnitude higher when patients are supplementing with the milligram doses of iodine and at these levels patients appear to not exhibit evidence of toxicity unless they are mobilizing bromine or other toxic substances.

All things considered, I think that the therapeutic use of iodine/iodide has the potential of drastically changing how medicine is practiced today, including the prevention and treatment of cancer. All of Dr. Guy Abraham's research papers relating to the Iodine Project may be viewed and downloaded free from the Internet by accessing: www.optimox.com and clicking on Iodine Research.

10. Fermented Wheat Germ Extract for Cancer Patients

A nutritional supplement that has been well researched for cancer patients is a fermented wheat germ extract developed in Hungary by Mate Hidvegi PhD, based on research initiated many years ago by Dr. Albert Szent-Gyorgyi, a recipient of the Nobel Prize in Medicine. Szent-Gyorgyi theorized that naturally occurring compounds called quinones would suppress anaerobic metabolism in cancer cells and enhance oxidative metabolism in normal cells. This is what the fermented wheat germ product, Avemar, does. However, it also appears to have several other mechanisms of action to help control the cancer process. These include: immune modulation; apoptosis induction; anti-angiogenesis activity; anti-metastatic activity and inhibition of cancerous DNA synthesis.

Avemar is produced by a patented process involving a fermented wheat germ extract that yields a uniform, consistent, all-natural dietary supplement. More than 100 reports have been written for presentation or publication describing research conducted

in the United States, Hungary, Russia, Austria, Israel and Italy. Its value has been validated by the publication of more than 18 peer-reviewed studies accessible on Medline. Clinical studies have shown that when Avemar is added to a program of conventional treatment for at least a year, long-term follow-up shows reduced progression of cancer, reduction of metastases and improved survival in a variety of cancers, including primary colorectal cancer[80], malignant melanoma[81] and head and neck cancers[82]. It also significantly reduces side effects from conventional treatment and improves the quality of life of patients using it. All of these studies are available at www.avemar.com. It appears to be very safe and there are no reported significant side effects in any of the studies.

11. Mushroom Extracts

(1) Background

A mushroom is the fruiting body of a fungus, which unlike plants, does not contain chlorophyll. Fungi are not classified as part of the plant or animal kingdom, but constitute their own kingdom. Their function appears to be to help recycle dead and dying matter. They help to decompose dead trees, plants and animals to form nutrients necessary for the growth of new plants and animals.

For centuries, it has been known that some mushrooms have the potential to make people sick or even kill them, while others have beneficial and healing effects. Mushrooms or mushroom extracts have been used in traditional medicine to enhance healing for hundreds of years. Two little booklets that nicely describe types of healing mushrooms with their therapeutic effects are by Lisa Alschuler ND[83] and Mark Stengler ND[84]. Each booklet is extensively referenced. Mushrooms that have been used therapeutically include: Agaricus bisporus (White Button), Agaricus blazei (Sun mushrooms), Cordyceps sinensis (Caterpillar Mushroom), Coriolus versicolor, also known as Trametes versicolor (Turkey Tail), Hericium erinaceus (Lion's Mane), Maitake (Dancing Mushroom), Reishi, Shitake and Tremelia fuciformins (Silver Ear or White Jerry Leaf).[28] Medicinal mushrooms have been integrated into the treatment of cancer patients and several of them have reported benefits in enhancing immune function, reducing side effects from conventional treatment and improving overall therapeutic results. The main medicinal mushrooms used as part of a cancer treatment program are: Agaricus, Maitake D-Fraction, lentinan from Shitake, PSK and PSP from Coriolus Versicolor, Reishi extract and Phellinus linteus.

Extracts from Coriolus have been developed in both Japan (known as PSK) and China (PSP). They are slightly different but both contain beta-glucans, a type of polysaccharide. These compounds are often prescribed in Japan and China as adjunctive treatment for cancer to stimulate immune support after surgery and/or during or after radiation and/or chemotherapy. In one ten-year study in Japan involving non-small cell carcinoma of the lung, the 5-year survival rate for stage I and II was 39% compared to 16% in patients not receiving PSK. For stage III lung cancers, 5-year survival for the PSK group was 22% compared to only 5% in the group not receiving PSK.[85] Another study, which was a randomized, double-blind placebo-controlled 10-year study that looked at the effects of PSK vs a placebo after colon-cancer surgery, clearly showed a statistically significant effect of improved survival for the PSK group.[86]

(2) Maitake D Fraction for Cancer

A good deal of work has been done with Maitake D fraction and I have introduced this supplement into my practice for cancer patients. Sensuke Konno, Ph.D. of the Department of Urology at New York Medical College in Valhalla, New York has been carrying out some interesting studies on Maitake D and has published several articles.[87, 33, 34] His focus has been on the in vitro cytotoxic effects of Maitake D on prostate and bladder cancer cells. In Figure 3, one can see how various concentrations of Maitake D can inhibit prostate cancer cell viability. Note that

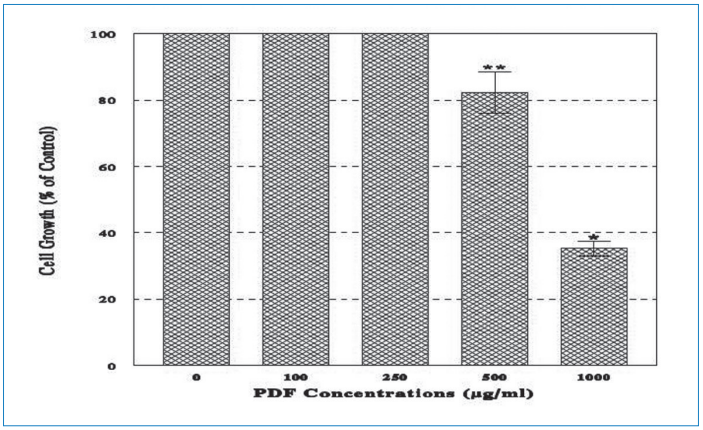


Figure 3 Effects of Maitake D Fraction on Cell Growth of PC-3 Cancer Cells in Vitro

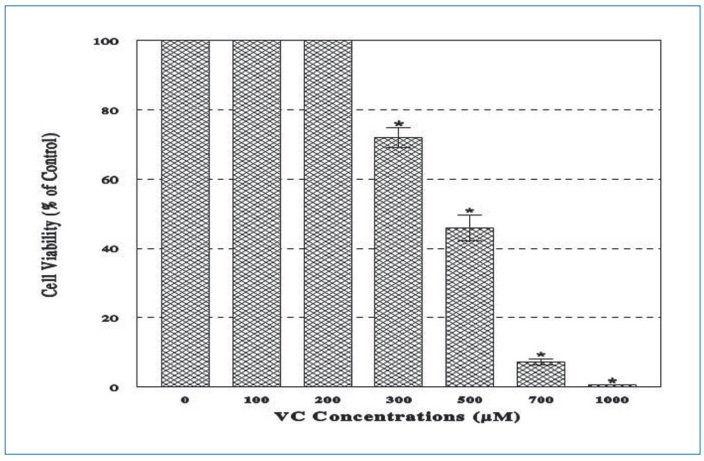


Figure 4 Effects of Vitamin C on Cell Growth of PC-3 Cancer Cells in Vitro

PDF = Maitake D fraction in these studies. At 500 mcg/ml, there is almost a 20% Inhibition of cancer cell viability, while at 1,000 mcg/ml there is almost 40%. Using this same model, Figure 4 shows us the cell viability potential of vitamin C. Note that it takes a concentration of 300 micromoles to begin inhibiting the prostate cancer cells with the most inhibition coming from 1,000 micromoles. In vivo, it is difficult to reach these levels. But, when Maitake D and Vitamin C are combined as shown in Figure 5, there is a synergistic effect with much lower doses of C and Maitake D being able to inhibit the cancer cells. An inhibitory effect of 90% is obtained with concentrations of C (only 200 micromoles) and Maitake D (150 mcg/ml), which are much lower concentrations than the doses needed to get inhibition when the 2 substances are used separately. So, there is clearly a synergistic effect. These levels can be reached with oral doses of about 500 mg of Vitamin C and 25 to 50 mg of Maitake D taken orally. The mechanism for this inhibition appears to be apoptosis[88], as shown in Figure 6. Dr. Konno has also shown a similar synergistic effect between Interferon Alpha 2B and Maitake D fraction on these prostate cancer cells.

Previously, Konno had shown the identical phenomenon of a synergistic effect of Maitake D fraction

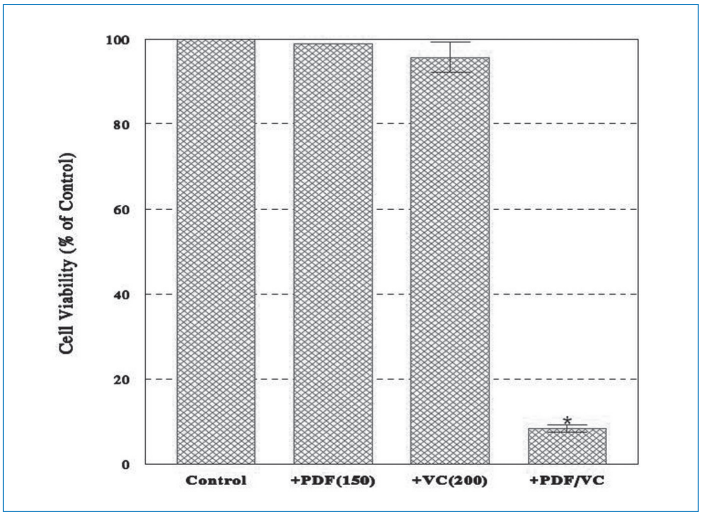
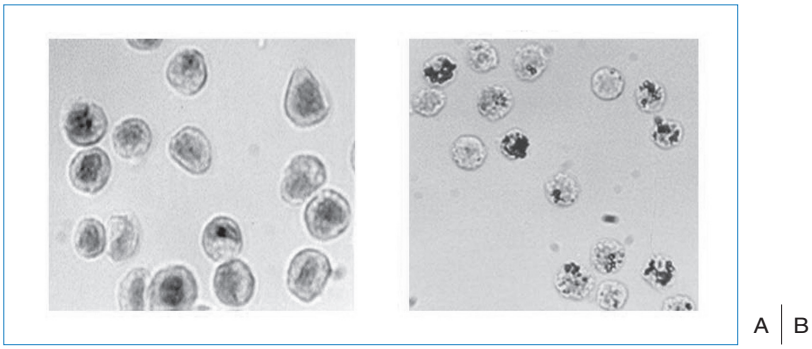


Figure 5　Potentiation of Maitake D Cytotoxicity with Vitamin C (V.C)



A | B

Figure 6　*In Situ* Hybridization Analysis
A) Appearance of PC-3 prostate cancer cells prior to treatment with Maitake D
B) Maitake D-treated shows apoptosis

and Vitamin C on human bladder T24 cancer cells. In this study, eight commercially available supplements were tested. These included YBG (Extract of yeast cell wall), ARBX (Arabinoxylan from rice bran); ABE (Extract of Agaricus blazei Murill mushroom); ASC (Mixed powder of Agaricus blazei Murill mushroom and shark cartilage); MSK (Mixed powder of three kinds of mushrooms and three herbs); AHC (Mycelial extract of several mushrooms); GD-fraction of maitake (D) Grifola frondosa mushroom) and PL-fraction (Extract of meshimakobu (Phellinus linteus), which is further discussed below. Six of them showed no effect, but Maitake D and Phellinus linteus did show an inhibition. When non-toxic concentrations of each of these products (30 micrograms/ml of beta-Glucan from Maitake D and 20 micrograms/ml of beta-Glucan from Phellinus linteus) was combined with non-toxic concentrations of Vitamin C (200 micromoles), there was >90% bladder cancer cell death. None of the other six products showed a synergistic effect with vitamin C.[89)]

Maitake D shows several anti-cancer effects in animal models, including: anti-carcinogenesis, inhibition of metastases and inhibition of cancer growth. It enhances immune function and the effects of a few anti-cancer chemotherapeutic drugs[90, 91)] while reducing the negative

side effects of many of them. It induces apoptosis and is synergistic with both Vitamin C and interferon. It is on the USA FDA's list of substances that are generally recognized as safe (GRAS list). Maitake D is available from Maitake Products in Japan and the USA. The dosage for supplementing cancer patients is 0.5 to 1 mg per kg of body weight per day in divided dosage, 3 to 4 times daily. So, the liquid Maitake D (1 mg per drop) can be given as 25 to 30 drops 3 times daily with 500 mg of Vitamin C each time to get the synergistic effect of the two together. It can also be administered as tablets (the 4X form) at a dosage of about 2 tablets 4 times daily for active cancer patients, again along with the Vitamin C 500 mg each time. Another fraction of the Maitake mushroom called Maitake SX can be used to help control the metabolic syndrome that predisposes people to cancer. The dosage of Maitake SX is generally 1 to 2 tablets 3 times daily within 30 minutes of completing a meal. It is synergistic with the Maitake D. Crude Maitake at a dosage of about 2 tablets 4 times daily is also synergistic.

(3) Phellinus linteus (Meshima or Women's Island) Extract for Cancer

Another mushroom extract that shows promise as an anti-cancer supplement is Phellinus linteus (also called Meshima or Women's Island). An article in the British Journal of Cancer in 2008 summarized this mushroom extract's anti-tumor activity: It enhances immune function; induces apoptosis; inhibits proliferation of cancer cells (anchorage dependent growth); inhibits colony formation of cancer cells (anchorage independent growth) and inhibits cancer cells at the S phase of the cell cycle via upregulation of p27.[92] In the study mentioned previously by Konno[34], Phellinus linteus extract was the only product, in addition to Maitake D, that had synergistic in vitro cytotoxic effects with vitamin C on human bladder cancer cells.

Mushroom extracts should certainly be considered for active cancer patients with or without conventional treatment. They also should be beneficial as a preventive for cancer in the first place and also to help prevent recurrences.

11. Mirko Beljanski's Products for Cancer Patients

(1) Four Supplements to Help Support Cancer Patients

Four supplements that I have used extensively in my practice for cancer patients since 1999 were developed by the late Mirko Beljanski PhD, a molecular biologist who was born in Yugoslavia, but spent most of his adult life doing biological research in France. He did extensive research on RNA and DNA and developed a theory about cancer that is quite profound. Information and books about his work are available at two websites: www.beljanski.com and www.natural-source.com. I had never heard of Dr. Beljanski or his research prior to 1999; but, when I was advised by a knowledgeable friend to attend a weekend conference that year concerning natural products for cancer patients, sponsored by a company named Natural Source, I decided to go. At this conference were residents of a few European countries (mostly France and Belgium) who were scientists, physicians and cancer patients who either had benefitted from these supplements developed by Beljanski or who had researched them or had administered them to patients with apparent benefits.

(2) Dr. Mirko Beljanski's Background and Research

I learned that Dr. Beljanski had died in 1998 after being persecuted by the French government for suggesting that these natural, non-toxic supplements might be helpful to cancer patients as adjuncts to their conventional treatment. His daughter Sylvie, an attorney, started this company Natural Source in New York City to promote her father's research work and his products. I was impressed with most of the presentations at this bilingual conference (French-English), reviewed many of Beljanski's research papers and began to use the supplements with some of my cancer patients. Many patients

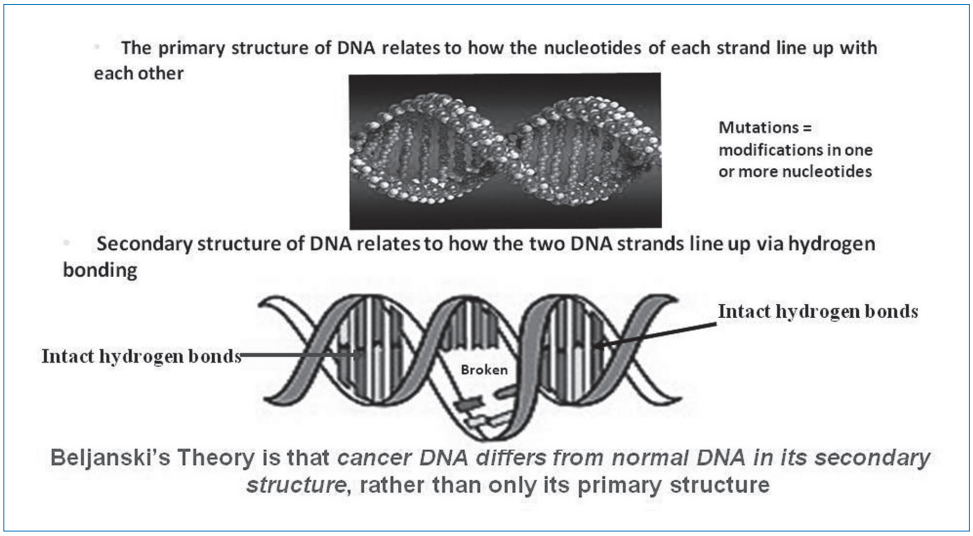


Figure 7　Beljanski's Theory of Cancer

appeared to benefit from them. During his lifetime, Beljanski did research for 30 years at the Pasteur Institute. He published 133 papers. Most of the earlier ones were in French and the later ones were mostly in English. Much of his work with RNA and DNA is summarized in his monograph, originally published in 1983.[93)]

(3) Beljanski's Cancer Theory involving the Secondary Structure of DNA

Dr. Beljanski's basic research on RNA and DNA led to the development of a theory about a mechanism for the development of cancer. During the 1960's and 70's, the predominant theory for the development of cancer was that mutations in the primary structure of DNA in certain classes of genes, namely pro-oncogenes, suppressor genes and DNA repair genes resulted in malignant changes in cells. Generally, the more mutations in these genes, the more aggressive would be the cancer cell. This change in the primary structure of DNA involved mutations, consisting of a change in one of the possible four bases, that were present in a pattern along the two DNA strands of the double helix structure of DNA.

Beljanski's new idea was that rather than just changes in the primary structure of DNA, changes in the secondary structure of DNA might contribute to the development of cancer. The secondary structure of DNA relates to the hydrogen bonding that takes place between the two strands of DNA. He suggested that carcinogenic substances could interfere with some of the hydrogen bonds between the two strands of the double helix, causing the formation of large loops between the strands. When this occurred, the DNA became destabilized, increasing the risk of a cell becoming cancerous.[94, 95)] This theory is illustrated nicely in Figure 7.

(4) The Oncotest for Determining Carcinogenic Substances

From this theory, Beljanski developed a test, which he called the Oncotest, to determine the carcinogenicity of a substance. He found that when he added a known carcinogenic substance to a solution of cancerous DNA, the cancerous DNA would proliferate. He could measure the increased growth of the cancerous DNA by measuring the absorbance of light. A carcinogen destabilized DNA and caused it to grow. In this way, he could measure an unknown substance's carcinogenic potential.[96)]

(5) Anti-Carcinogenic Substances or Bolt Molecules (Extracts of Pao Pereira and Rauwolfia Vomitoria)

Having developed a test to evaluate whether or not

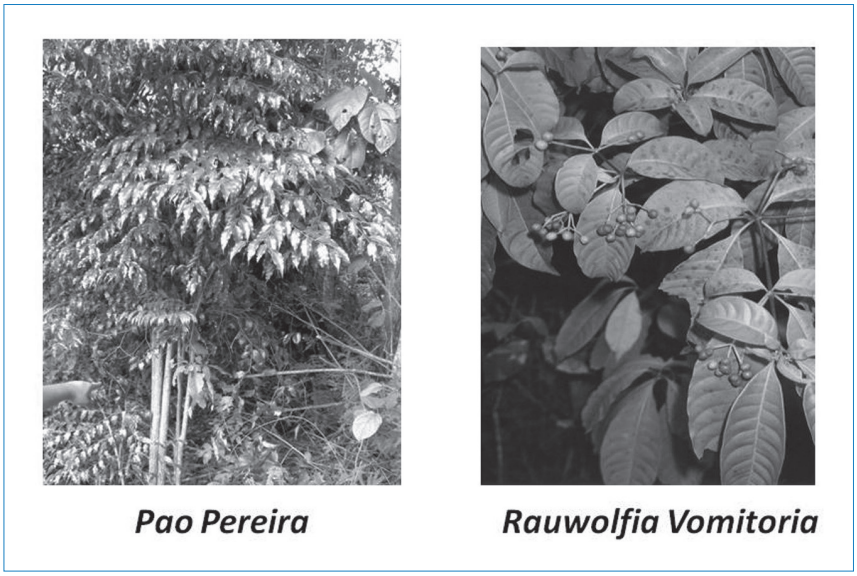


Figure 8　Two Substances with Anti-Cancer Properties

a substance could destabilize DNA, which contributed to the development of cancer, Beljanski wondered if he could find substances that could restabilize DNA, which he termed bolt molecules. He screened many different compounds and found some herbal alkaloid substances that could do this.[97)]

He extensively tested extracts from two herbs (Pao Pereira and Rauwolfia Vomitoria, shown in Figure 8) and found that each of them had selective damaging effects against a wide variety of cancer cells in vitro, including liver, thyroid, brain and breast. Applying these compounds to cancers in mice, he showed that agents were selective in destroying cancer cells and not harming normal cells and also that they were synergistic with at least some chemotherapy drugs.[98)] He found that the Rauwolfia Vomitoria extract (also called BG-8) was slightly better in hormone related cancers, while Pao Pereira (also called PB-100) was capable of crossing the blood-brain barrier and therefore might be helpful in brain cancer.[86)]

He was able to demonstrate clearly that Pao Pereira could penetrate and damage glioblastoma cancer cells while not penetrating normal brain glial cells, as shown in Figure 9)[99)] and had several other papers published on the effects of Pao Pereira on brain cancer cells.[100-103)] In another publication, he showed that both Pao Pereira (PB-100) and Rauwolfia Vomitoria (BG-8) were active against human melanoma cells but not non-malignant fibroblasts.[104)] Recently, Natural Source has funded research at Columbia University's Holistic Urology Department, headed by Aaron Katz MD. One recently published paper showed that Pao Pereira had anticancer effects against prostate cancer cells in vitro.[105)] Both the Pao Pereira and Rauwolfia Vomitoria supplements are available commercially from Natural Source and can be obtained as nutritional supplements to support cancer patients. The dosage we generally use with each of these supplements is about 2 capsules of each three times daily. Natural Source also has combinations of these extracts in one capsule.

(6) RNA Primers to Enhance Production of Normal White Blood Cells and Platelets

In addition to his work with anti-cancer herbal extracts, Dr. Beljanski had two more lines of research that led to potential breakthroughs in the management of cancer patients. The first one involved enhancing normal white blood cell and platelet formation; the second will be discussed in the next section. It involves inhibiting damage from radiation. Beljanski

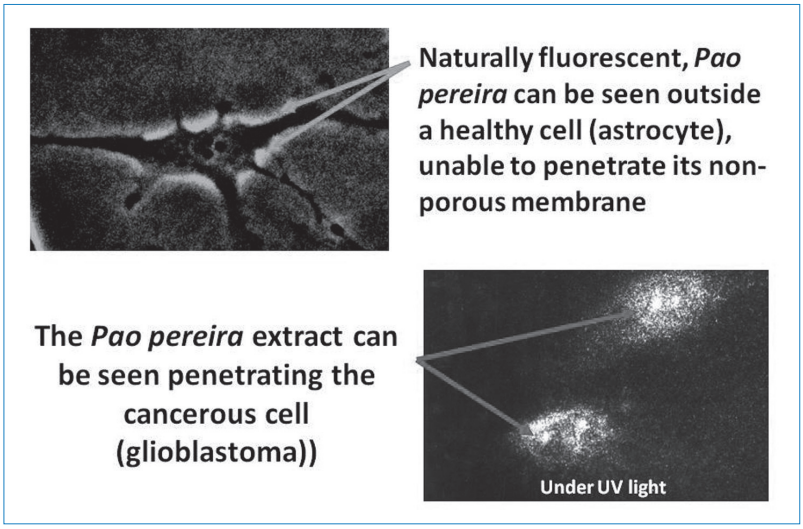


Figure 9　Selectivity of Action

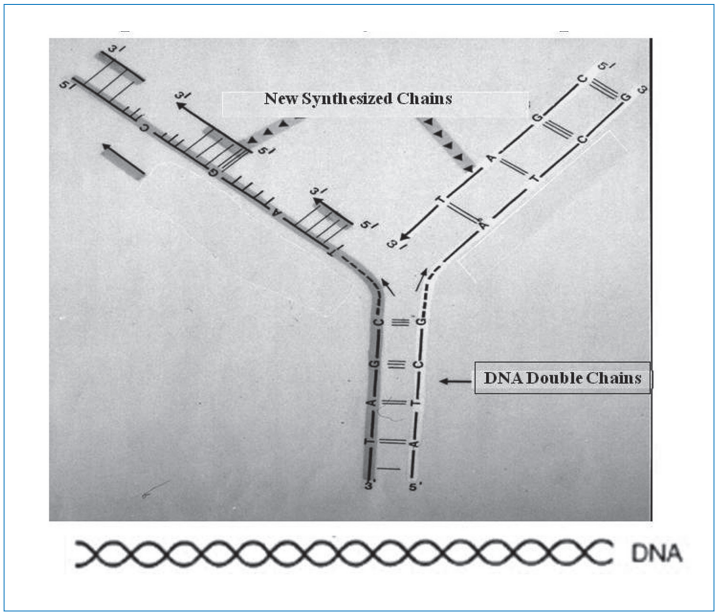


Figure 10　RNA primer necessary for DNA replication

discovered that normal cells undergoing replication require RNA entities that he called primers, which improve the efficiency of the replication process. This is shown in Figure 10. The RNA primers interact with the newly formed DNA strands to bring about enhanced replication of the DNA. He found a way to produce large quantities of these RNA primers, using a strain of non-pathogenic E. Coli. These RNA primers had profound effects on some of the cells in the bone marrow. In a published paper in 1979, Beljanski was able to show that, with RNA primers, he was able to drastically increase the production of all normal white blood cells and megakaryocytes that led to the production of platelets but not red blood cells in rabbits.[106] Incidentally, this discovery was an extremely important breakthrough in biological

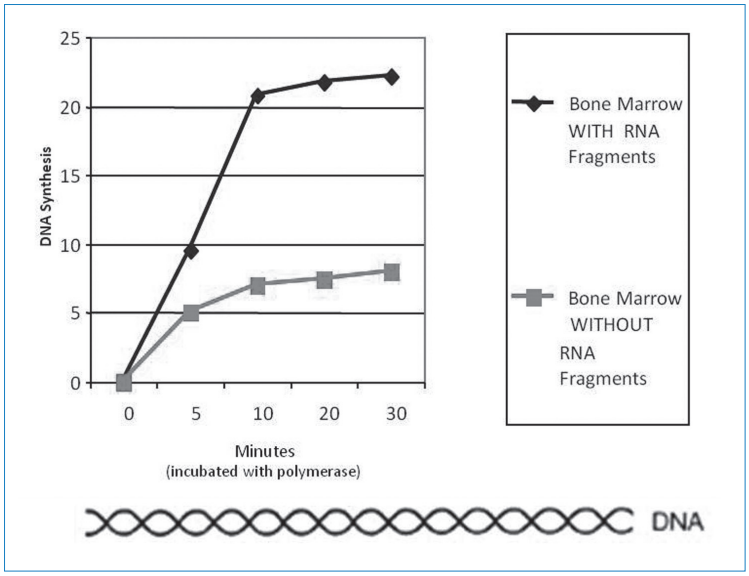


Figure 11　Bone Marrow DNA Stimulated by RNA Primer Fragments

understanding. Up until this time, the dogma was that DNA can affect the production of RNA, but not vice-versa. In fact, Beljanski ran into trouble at the Pasteur Institute with the Director who was one of the discoverers of how DNA affects the production of RNA. The director was angry that Beljanski insisted on publishing his own studies that questioned the dogma of the time; that DNA could affect RNA, but that the reverse was not true.

Figure 11 shows how normal DNA synthesis is increased with these E. Coli RNA primers. A year later, Beljanski was able to show that these short chain RNA fragments could serve as promoters of leucocytes and platelets in animals depleted by anti-cancer drugs.[107] In 1981, Beljanski and Plawecki published a paper showing how the RNA primers were able to save the lives of rabbits that developed severe leucopenia following the administration of the chemotherapeutic agent cyclophosphamide. With the administration of the RNA primers, the rabbits were able to increase their leucocyte production. In this study, all of the untreated rabbits died within 10 days while all of the treated rabbits lived for 50 days, having received the RNA primers after each dose of cyclophosphamide (See Figure 12).[108, 109] The rabbits that received the RNA fragments were able to create a new generation of white blood cells every time they were given a new dose. There was no exhaustion of the bone marrow. There was no release of existing immature cells. Instead there was the creation of brand new stem cells that provided healthy white blood cells. Over the whole duration of the treatment, the rabbits were able to create a new generation of white blood cells every other day. This makes this product very different from the current approved drugs in the United States as these drugs stimulate only the production of neutrophils while the RNA primers stimulate the production of all kinds of white blood cells plus platelets.

In 1991, Beljanski and his colleagues reported on the successful use of RNA fragments in two patients with non-Hodgkin's lymphoma.[110] Recently, I heard a verbal report about the RNA fragments given to cancer patients presented by a PhD from the Cancer Treatment Centers of America. He said that the oncologist, with whom he had worked frequently, had to stop doing chemotherapy treatments with his patients because the patients developed dangerously low platelet counts (as many as 40% had to stop treatment). They then used the RNA fragments and

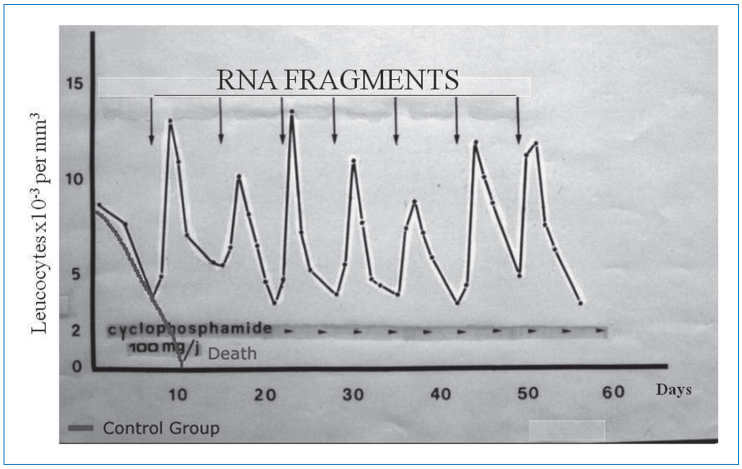


Figure 12　Evolution of Leukocyte Cells in Presence of Cyclophosphamide and RNA Fragments (10 Rabbits)

none of the patients had to stop treatment. This report has not yet been published but the preliminary results sound quite promising. The RNA fragments are available as a powder in a cone. This powder is dissolved sublingually about 3 times a week when radiation and/or chemotherapy are given. However, larger doses were used during the Cancer Treatment Centers of America's preliminary trial. Patients received the treatment as often as twice daily when the platelets dropped and apparently this worked.

One would think that all patients receiving conventional chemotherapy and radiation might benefit from treatment with these RNA primers. However, since they are not patentable drugs (as they are natural products) and the amount of money required to go through the procedures of the FDA for them to become approved as a drug are astronomical for a small supplement company, it is difficult to see how they can be brought to the attention of the health care community. At the same time, the company must be very careful not to make any claims because the FDA and/or FTC could close them down for making unapproved statements for unapproved drugs. I don't know what the solution to this problem is other than to change the system or to help practitioners become aware of the benefits of these nutritional supplements and to use these safe products with their patients while they undergo conventional treatment. Practitioners will find out soon enough if the RNA primers work and I think they will work if they are used properly.

(7) An Herbal Extract to Help Regulate Enzymes and Reduce Abnormal Fibrosis

The final Beljanski nutritional product, potentially helpful to cancer patients, evolved from a different phase of Beljanski's research related to protection against radiation fibrosis and correction of enzyme dysregulation that occurs in many chronic conditions including cancer. It is a specially prepared form of Ginkgo Biloba that shows evidence of protection against damage from radiation and correction of enzyme dysregulation.

In the early 1990's, the French army hired Beljanski to find a way of reducing radiation damage using an American anti-radiation product known as W2721. In 1991, Beljanski published a paper showing how this product, along with his RNA primers, was able to protect against radiation.[111] Although W2721 was an effective protector, it had two serious drawbacks; namely it had to be administered intravenously and it had to be kept at a very low temperature. These constraints were not compatible with the military's needs and were the reason why the product was abandoned. As allowed by the contract, Beljanski sought other alternative substances. Due to both its biochemical make-up and

legendary resistance to environmental stresses like the atomic bombings of Hiroshima and Nagasaki, Dr. Beljanski began to focus on the Ginkgo Biloba tree.[112)]

Beljanski developed a method of preparation of Ginkgo Biloba quite different from the usual Ginkgo preparations available commercially and his preparation had different qualities and different actions. It was harvested at a different time of the year which allowed him to use golden rather than the green leaves and it was extracted with water rather than alcohol. The original name was Bioparyl but it was later renamed by Natural Source as Ginkgo V. This preparation turned out to be an enzyme regulator. As mentioned above, Beljanski showed that normal RNA primers were necessary for the replication of normal white blood cells and the formation of megakaryocytes that lead to the formation of platelets. Cancer cells require abnormal RNA primers and abnormal ribonuclease enzymes that break down RNA into these smaller chains. So, ribonucleases are very active in cancer cells. This Ginkgo extract reduces ribonucleases and normalizes them in cancer and in other abnormal conditions such as autoimmune diseases. It also helps to normalize and regulate other abnormal enzyme activity. Another aspect of this enzyme regulatory activity is that this Ginkgo extract was found to reduce abnormal fibrosis or scarring from radiation and from wound healing.[113)] The usual dose of this supplement is 2 capsules 3 times daily. Therefore, patients undergoing radiation or having undergone surgery should consider using this nutritional supplement to promote healing and prevent abnormal fibrosis.

To summarize, the research work of Mirko Beljanski led to the development of four nutritional supplements that are potentially beneficial to cancer patients either alone or in combination with conventional treatments. Two of them (extracts of Pao Pereira and Rauwolfia Vomitoria) have selective anti-cancer activity, meaning they selectively damage cancer cells but not normal cells. One of them (RNA fragments from non-pathogenic E. Coli) is useful for stimulating all types of normal white blood cells and platelets and is particularly beneficial for patients undergoing radiation and/or chemotherapy. Finally, the last special extract from Ginkgo Biloba has been used as a nutritional supplement to help prevent abnormal scar tissue formation from radiation or surgery.

(8) Dr. Beljanski's Cooperative Work with Physicians and His Political and Legal Problems

As long as Dr. Beljanski's research work was confined to his laboratory, he had no legal problems with authorities. However, as colleagues and patients became aware of his research, there began to be a demand to use what he had developed to help people. His work was pretty much ignored or rejected by conventional oncologists, but some family practitioners in France and Belgium wished to incorporate the results of his work into helping their patients and an informal network began to develop. This demand grew rapidly as many patients with cancer and other conditions greatly benefitted from his products, all of which could be taken orally or sublingually (in the case of the RNA fragments). Thousands of patients became aware of his nutritional products and began to take them, often along with conventional treatments. Dr. Beljanski always wanted to work cooperatively with the medical profession and wished his products to be used with conventional treatments. Many patients, under the supervision of their health professionals, administered the plant extracts to work synergistically with surgery, radiation and chemotherapy. Others sought out Beljanski on their own and began to take the plant extracts after being told by conventional physicians that nothing more could be done. Many of them thwarted their prognoses and wound up doing extremely well. Beljanski's reputation grew and improved.

Unfortunately, however, for a variety of reasons, including a challenge to the prevailing medical paradigm (See discussion below), a threat to the economic status quo, professional envy and jealousy and many other reasons (which involved some very powerful

people), Beljanski began to develop some enemies, as always occurs when there is a threat to the current medical paradigm and threats to the economic status quo. A growing danger for Beljanski was developing.

Perhaps the most famous patient who benefitted from the Beljanski products was the late former French President Francois Mitterrand, shown in Figure 13. During his term in office, Mitterrand developed prostate cancer which he kept a secret until the middle of his second term. By this time, the prostate cancer was so advanced that his prognosis was considered grim and he was predicted to live only a few months by his conventional physicians. The country was preparing for early elections when Mitterrand decided to use the Beljanski products. Against all odds, his health began to improve and Mitterrand was able to remain in power until the end of his term. But, in the process, some powerful people became infuriated because some natural alternative treatment had thwarted Mitterrand's prognosis and the opportunity for some of these people to seize power was also thwarted. So, when Mitterrand ultimately passed away about 18 months after he left office, the French government brutally shut down Beljanski's laboratory and mercilessly persecuted him. He was accused of practicing medicine without a license and other similar charges. Unable to do what he loved and being blocked from leaving the country, Beljanski became ill and did not have access to his own products. He died in 1998. Around that time, with a pledge to her father that she would continue his work, his daughter Sylvie set up the company Natural Source in the USA with the help of her mother Monique who had worked with Mirko for close to 50 years.

Today, the Beljanski products are still relatively unknown to most physicians including oncologists throughout the world. They are being recommended in Europe by a handful of clinicians and are being used primarily in France and Belgium by a minority of cancer patients. In the USA, a few integrative physicians, including myself, have used them primarily with cancer patients. In my opinion, they have value and should be used as part of a total integrative cancer treatment program.

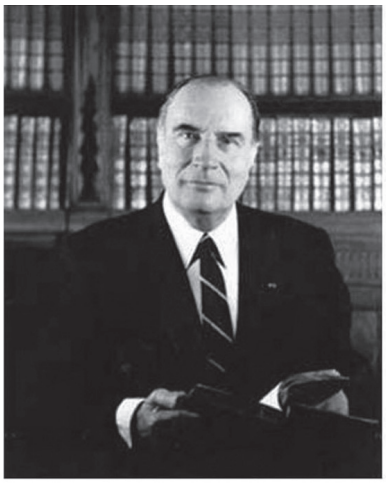


Figure 13　François Mitterrand (1916-1996) Prostate cancer was about to alter the history of a country.

13. Stanislaw Burzynski MD, PhD and Antineoplastons: The Science and Legal Problems

A native of Poland with an MD and a PhD in biochemistry, Dr. Burzynski migrated to the USA in the early 1970's. His research led him to the conclusion that cancer patients appeared to have a deficiency of a number of small molecules in both blood and urine that were present in higher amounts in normal patients. He observed this phenomenon in animals as well. Furthermore, these natural non-toxic substances appeared to have strong anti-cancer activities. He named these substances antineoplastons and postulated that animals and humans have two defense systems in the body. The immune system primarily addressed infectious processes, while the antineoplaston system had evolved primarily to deal with cancer. He further showed that these antineoplastons work by switching certain genes on or off. A person with cancer has pro-cancer genes (oncogenes) turned on and anti-cancer

genes (suppressor genes and DNA repair genes) turned off. The job of the antineoplastons is to do the opposite, namely turn pro-cancer genes off and turn anti-cancer genes back on. Doing basic research with cancer cells in vitro and animal experiments, Burzynski has been quite successful in accumulating evidence for his theories. Additionally, he has run clinical trials and has helped many advanced cancer patients against massive odds. His survival statistics for brain cancer in adults and children are the best in the world. He has published numerous scientific studies internationally in peer-reviewed journals. Dr. Burzynski authored an excellent review of his work along with a listing of many of his publications in the journal *Integrative Cancer Therapies*.[114] This article can be accessed as a PDF file at: http://www.burzynskiclinic.com/assets/documents/Pub SRB 2004 Present State of ANP Research.pdf.

Nevertheless, like Beljanski, Burzynski has had many problems with regulating agencies. Whereas Dr. Beljanski's legal problems occurred in France, Dr. Burzynski's problems occurred in the USA. Burzynski has had problems with the United States Food and Drug Administration (FDA), the state of Texas, the state medical board of Texas and other agencies. Unlike Beljanski in France, Burzynski has been amazingly successful in battling these regulatory agencies. A book that summarizes Dr. Burzynski's scientific and clinical work, as well as his legal trials and tribulations, is Thomas Elias' *The Burzynski Breakthrough: The Most Promising Cancer Treatment…and the Government's Campaign to Squelch It*.[115] A documentary full length motion picture about Burzynski's struggle with the various regulatory agencies was released in early 2010. With incredible precision and documentation, this film "Burzynski", directed by young Eric Merola shows what Burzynski has experienced and how the Government and other regulatory agencies seemingly stopped at nothing to destroy his career and his work.[116] In April 2010, it won the Humanitarian Vision Award at the Newport Beach Film Festival 2010. See: www.burzynskimovie.com and see this movie as soon as you can. It is a must. Burzynski's success has come as a result of many factors. These have included: his unbelievable tenacity as a person, clinician and scientist; his patients who have attended court hearings and congressional hearings; pressure from the US Congress (as a result of hearings) on the FDA and many influential friends like Julian Whitaker MD who has a widely read influential health newsletter and who mustered support and money for Burzynski's cause. So, with great reluctance, the FDA has allowed him to try to obtain drug approval for his products. This is the first time in history that a private clinician and scientist has been allowed to do this. The FDA's policies are such that only large pharmaceutical companies with large financial support can go through this process. So, at the time of this writing, antineoplastons can be used for only very few conditions.

On the other hand, Beljanski's work is being evaluated and used at the University of Kurume Medical School in Japan. Several papers from this university have been published over the past few years about antineoplastons.[117-120]

14. Other Nutritional Supplements

This paper has barely scratched the surface on the use of nutritional supplements to support cancer patients. I have chosen to emphasize certain supplements that have either been very controversial (most of the ones I discussed), not widely known among clinicians and ones that I thought could be implemented immediately to help patients. This is not to say that there aren't many, many other nutritional supplements for which there is a great deal of evidence for benefits. These are seen in the books of Boik and Quillin discussed in this paper, the Jaakkola study on small cell lung cancer and the Hoffer studies also previously discussed. Among the areas that really deserve much more attention are the systemic use of proteolytic enzymes (as utilized by the late Donald William Kelly and Nicholas Gonzalez and written about by Ralph Moss); the use

of high doses of vitamin D3 to produce optimal serum levels; the use of vitamin K to help with utilization of vitamin D; vitamin A; various phytonutrients like sulforaphane from broccoli extracts; resveratrol; curcumin; various pre and probiotics and many, many others. The trick is to try to put all of this together in a comprehensive manageable program for the cancer patient. To cover these in depth would indeed require a book and some of this material is available in the books and articles that have been cited.

15. Old vs. New Paradigms in Health Care and the Politics and Economics of Health Care Worldwide

Finally, it is necessary to touch on the difficulties of trying to practice integrative oncology and/or integrative medicine in general in the current international environment. Julian Whitaker MD, an integrative physician with his own newsletter, a great following, and a major supporter of Dr. Burzynski both financially and in many other ways, appears in the new movie "Burzynski". He tries to explain the resistance to new ideas in health care and his explanation was an eye-opener to me since my own thoughts were that the problem is entirely related to economics. However, this does NOT explain it all. Whitaker points out that it is very hard to change a paradigm and the paradigm for health care is very rigid.

He uses as an example the case of Dr. Ignaz Philippe Semmelweis, who was a Hungarian physician described as the "savior of mothers", who discovered by 1847 that the incidence of puerperal fever could be drastically cut by the use of hand disinfection (by means of hand washing with chlorinated lime solution) in obstetrical clinics. Puerperal fever, which was discovered later to be due to a bacterial infection caused by physicians moving from pathology laboratories where bodies were dissected to Obstetric wards, killed many women and their offspring (mortality estimated at between 10 and 35%). Rather than greeting him with awards, colleagues of Semmelweis belittled him and failed to follow his advice which resulted in continued deaths. It was not until Pasteur explained Semmelweis' recommendations in terms of germ theory that Semmelweis' recommendations were implemented many years after his death. Semmelweis died a pauper in a hospital from a psychiatric or neurological disease at the age of 47 in 1865, 18 years after first offering his theory and recommendations. Dr. Whitaker points out that in Semmelweis' situation, there was no money at stake but only the difficulty changing the medical paradigm.

Today, the conventional medical paradigm involves a doctor, collecting signs and symptoms from a patient, possibly ordering some tests, coming up with a diagnosis and prescribing an approved patentable drug or recommending surgery or some other invasive procedure. Activity outside this paradigm is often ignored, ridiculed or attacked. There is not much emphasis on finding underlying causes such as environmental toxins, suboptimal diets, poor lifestyle and similar factors in interaction with the genotype of the person. Epigenetics is largely ignored. Today, unlike the issue in the Semmelweis case more that 100 years ago, money is a major factor. The entire health care industry is supported by the pharmaceutical industry and virtually all medical school education and post graduate training is supported by the wealthy pharmaceutical industry. Its many lobbyists have profound effect on legislation in the United States and largely control the media, especially here in the USA. Legislators have passed legislation to exempt pharmaceutical companies from harm caused by vaccines while getting legislators and the various governmental agencies to mandate vaccines. This is true, even though evidence continues to mount that current vaccine schedules are causing undue harm such as an increase rate of autism, hyperactivity, asthma, allergies, and even cancer in children. Public authorities with reputations to uphold and a continuous supply of money from pharmaceutical companies continue to deny any link and use their authority to denigrate and ridicule those that criticize the medical paradigm.

The entire FDA system of drug approval is designed to keep this system of patentable drugs flowing while downplaying the approaches described in this article. The system is further reinforced by the Federal Trade Commission that attacks anything that sounds like a health claim, if it is not backed by the FDA, even though it may be true.

In spite of all of this, the public is becoming wiser largely as a result of more information available via the Internet and more and more people taking charge of their health; making their own decisions rather than just relying on their doctors or the industry-supported media. It is essential that forward thinking physicians begin to understand the new paradigm relating to health care and begin to incorporate this new knowledge into their care of patients in order for us to make progress in health care and, indeed, in the survival of our planet.

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